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Distillation Operations in Synthetic Organic Chemical Manufacturing Industry. Background Information for Promulgated Standards

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15. SUPPLEMENTARY NOTES This document presents the background information used by the Environmental Protection Agency in developing the final new source performance standards for emissions of volatile organic compounds from distillation unit operations in the synthetic organic chemical manufacturing industry.

16. ABSTRACT

Standards of performance for the control of volatile organic compound (VOC) emissions from distillation unit operations in the synthetic organic chemical manufacturing industry are being promulgated under Section 111 of the Clean Air Act. These standards will apply to VOC emissions from newly constructed, modified, and reconstructed distillation units. This document summarizes the responses to public comments received on the proposed standards and the basis for changes made since proposal.

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Pollution control		
Standards of performance		
Organic chemical industry		
Volatile organic compounds (VOC)		

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Distillation Operations in Synthetic Organic Chemical Manufacturing Industry — Background Information for Promulgated Standards

Emissions Standards Division

U.S. ENVIRONMENTAL PROTECTION AGENCY
Office of Air and Radiation
Office of Air Quality Planning and Standards
Research Triangle Park, North Carolina 27711
June 1990

ENVIRONMENTAL PROTECTION AGENCY

Background Information and Final Environmental Impact Statement for Volatile Organic Compound Emissions from Distillation Processes in Synthetic Organic Chemical Manufacturing

Prepared by:

Jack R Farm 6/18/90

Jack R. Farmer (Date)
Director, Emission Standards Division
U. S. Environmental Protection Agency
Research Triangle Park, North Carolina 27711

1. The promulgated standards of performance will limit emissions of volatile organic compounds from new, modified, and reconstructed distillation processes. Section 111 of the Clean Air Act (42 U. S. C. 7411), as amended, directs the Administrator to establish standards of performance for any category of new stationary source of air pollution that ". . . causes or contributes significantly to air pollution which may reasonably be anticipated to endanger public health or welfare."

2. Copies of this document have been sent to the following Federal Departments: Labor, Health and Human Services, Defense, Transportation, Agriculture, Commerce, Interior, and Energy; the National Science Foundation; State and Territorial Air Pollution Program Administrators; EPA Regional Administrators; Local Air Pollution Control Officials; Office of Management and Budget; and other interested parties.

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1.0 SUMMARY

On December 30, 1983, the Environmental Protection Agency (EPA) proposed standards of performance for distillation operations in the synthetic organic chemical manufacturing industry (48 FR 57538) under the authority of Section 111 of the Clean Air Act. Public comments were requested on the proposal in the Federal Register. There were 34 commenters, most of whom are industry representatives. Comments were also received from a vendor of equipment used to control emissions from distillation operations and from a representative of an environmental group. On May 16, 1985, EPA reopened the public comment period (50 FR 20446) for the purpose of allowing public comment on the results of the Agency's reanalysis of the total resource effectiveness (TRE) equation and coefficients, the costing procedures, and the designation of affected facility. The reanalysis resulted from the acquisition of new information received in public comments and collected since proposal. In response to the reopening of the public comment period, one comment was received. The comments that were submitted, along with responses to these comments, are summarized in this document. The comments and subsequent responses serve as the basis for the revisions made to the regulation between proposal and promulgation.

1.1 SUMMARY OF CHANGES SINCE PROPOSAL

Several changes and clarifications were made in the regulation as a result of the review of public comments. Changes and clarifications were made in the following general areas: (a) affected facility designation; (b) applicability of the standards; (c) exemptions; (d) treatment of negligibly photochemically reactive compounds; (e) monitoring requirements; (f) flare operating specifications; (g) TRE coefficients; (h) incorporation of a TRE index value above which monitoring and recordkeeping are not required; (i) general definitions; (j) net heating value equation; and (k) miscellaneous.

1.1.1 Affected Facility Designation

The EPA has decided to change the designation of affected facility used in the standards. The designation of affected facility in Section 60.660(a) has been changed from a single distillation unit with the associated recovery system to each recovery system and all associated distillation units venting to that recovery system. Each distillation unit not feeding offgas into a recovery system would constitute a separate affected facility. Because this designation does not require apportioning of vent streams, Sections 60.664(c)(1)(ii) and (iii), which specify the method of apportioning where distillation columns share a common recovery system, have been deleted from the regulation.

1.1.2 Applicability of the Standards

The natural products -pinene; coconut oil acids, sodium salt; fatty acids; tall oil, sodium salt; tallow acids, potassium salt; and tallow acids, sodium salt; have been deleted from the list of affected chemicals in Section 60.667. The manufacture of products derived from natural sources such as these is not within the scope of this new source performance standard (NSPS), which is intended to focus on synthetic organic chemical manufacturing processes. Three fertilizer chemicals, ammonium carbamate, urea ammonium nitrate (UAN) and urea have also been deleted from the list in Section 60.667. According to information available to the Agency, the production of ammonium carbamate and UAN does not involve the use of distillation operations and no significant volatile organic compounds (VOC) are emitted during the production of urea.

Some commenters were concerned that trace amounts of listed chemicals in a product stream would cause them to be subject to the standards. This NSPS would only be applicable to distillation operations within process units producing as a product any of the chemicals listed in Section 60.667. A definition of "product" has been added to the regulation to clarify that the chemical is produced as a product when it is produced for sale or use in another process unit, and that by-products, coproducts, and intermediates are considered "products" for the purposes of these standards. This new definition clarifies what constitutes production of one of the 211 high production volume chemicals listed in Section 60.667.

1.1.3 Exemptions

Batch distillation operations have been exempted from the standards. The control technologies considered in the development of the distillation NSPS are appropriate for continuous processes but may not always be applicable to batch processes because batch processes typically have intermittent vent streams. Therefore, EPA has decided to exempt batch processes explicitly in Section 60.660(c). In addition, to clarify what is meant by a "batch distillation operation" a definition of this term has been added to Section 60.661. This definition emphasizes the noncontinuous operation and the discrete liquid feed nature of batch distillation operations.

The low flow rate exemption has been changed from a design flow rate basis to an operating flowrate basis in Section 60.660(c). The EPA recognizes that distillation facilities may be designed at the exemption level but may operate at levels above or below this design flow rate. The recordkeeping (Section 60.665(i)) and the semiannual reporting (Section 60.665(1)(5)) requirements for the low flow rate exemption have been likewise amended to reflect this change.

1.1.4 Negligibly Photochemically Reactive Compounds

The distillation standards are intended to control VOC, i.e., compounds that participate in atmospheric photochemical reactions to produce ozone. Therefore, negligibly photochemically reactive compounds are permitted to be subtracted from the total organic compound (TOC) emissions measured for calculation of the TRE index value. However, when determining combustion device emission reduction efficiency they should not be subtracted because combustion devices are not compound-specific with respect to VOC destruction. Furthermore, it is more costly and complex to subtract the negligibly reactive compounds during performance testing.

In order to effect this change, Section 60.661 was amended to indicate that the definition of "TOC" means TOC less all compounds that have been determined by the Administrator to be negligibly photochemically reactive. This definition is used only when applied to Sections 60.664(d)(2)(i) - measuring molar composition; 60.664(d)(5), and 60.664(e) - measuring hourly emissions rate; and 60.665(b)(4) and 60.665(g)(4) - measuring TOC concentration. For all other quantifications of TOC under these standards, VOC equals TOC less methane and ethane as indicated in Section 60.662(a). The Federal Register citations for the list of negligibly photochemically reactive compounds that may be subtracted are presented in Appendix A and have also been added to the definition of TOC in Section 60.661 of the regulation.

The definition of "TRE index value" has been amended to incorporate the change in the definition of "TOC." The TRE is now defined as "a measure of the supplemental total resource requirement per unit reduction of total organic compounds . . ., emission rate of total organic compounds. . . ."

1.1.5 Monitoring, Testing, and Reporting/Recordkeeping Requirements

The required use of flow rate monitors for vent streams routed to thermal incinerators has been changed. The EPA has decided to require the use of flow indicators rather than flow rate monitors for incinerators because the reason for monitoring is to provide an indication that the vent stream is being routed for destruction and flow indicators adequately serve this function. This requirement is consistent with vent stream monitoring requirements for all other combustion devices that may be used under the standards. Thus, Section 60.663(A)(2) has been amended to indicate that a flow indicator is to be used. Likewise, the reporting and recordkeeping requirements for flow monitoring in Section 60.665(c)(3) have been deleted and replaced with reporting and recordkeeping requirements for flow indication that are integrated into Section 60.665(d).

Ultraviolet beam heat sensors have been included in addition to thermocouples as suitable devices for the monitoring of the presence of a flame. Section 60.663(b)(1) has been amended to indicate this.

The "continuous recording" requirements have been changed. All measurements such as firebox temperature, absorber liquid specific gravity, carbon adsorber steam mass flow rate, and others are now required to be taken at least every 15 minutes. This allows use of computer-assisted monitors.

The frequency for measurement of these parameters during compliance testing has also been revised to be made at least every 15 minutes. Section 60.665(b) has been amended accordingly. An advantage of this change is that the parameter measurement frequencies required for monitoring and continuous recording are consistent with the frequencies required in compliance testing. Furthermore, the same equipment may be used for both monitoring and compliance testing.

1.1.6 Flare Operating Specifications

Operating specifications for flares used to comply with requirements in new source performance standards (NSPS) were recently added to Section 60.18 of the General Provisions (51 FR 2701, January 21, 1986). The regulation has been revised to refer all owners or operators of affected facilities which use flares to comply with this NSPS to the requirements in that section.

1.1.7 TRE Coefficients

Tables 1 and 2 of the regulation present the incinerator and flare coefficients associated with the TRE index equation. Some of the coefficients in these tables were corrected to predict more accurately the TRE indexes (and associated cost-effectiveness values) of facilities. The modifications of the coefficients resulted from changes in the costing procedures on which these coefficients are based. The changes in costing procedures and TRE coefficients are discussed in the Agency's notice reopening the public comment period for the proposed distillation standards (50 FR 20446).

Several modifications were also made in the format of Table 1 to provide clarity to owners or operators of distillation facilities. These modifications included: (a) the designation of Category A1 and A2 streams was changed from "chlorinated" to "halogenated"; (b) the designation for flow rate was changed from "W" to "Q_s" so that the symbol would match the symbol in the EPA Reference Methods discussion; (c) the term representing flow rate intervals for selecting TRE coefficients was changed from "design standard flow rate" to "vent stream flow rate" to indicate that actual operating flow rate should be used in selecting TRE coefficients; (d) the first flow rate interval was eliminated because all vent streams with flow rates below the minimum incinerator size of 500 scfm are assumed to have a flow rate of 500 scfm for the purposes of calculating capital and annual operating costs; and (e) the term representing flow rate for Category E streams was changed from "design standard flow rate" to "dilution flow rate = $(Q_s)(H_T)/3.6$" to indicate that dilution flow rate should be used in selection of TRE coefficients. Table 1 presents the coefficients for the incinerator TRE equation. Table 2 presents the coefficients for the flare TRE index equation.

1.1.8 Incorporation of a TRE Index Value Above Which Monitoring and Recordkeeping Are Not Required

Several changes were made in the regulation to provide for inclusion of a maximum TRE index value. The maximum TRE index value of 8.0 represents the value above which monitoring and recordkeeping requirements would not be imposed on a facility attempting to comply with the standards. It is the judgment of the Agency that facilities with TRE index values above the maximum would most likely not be able to make process changes that would cause the TRE index value to fall below the cutoff. Thus, the Agency believes that the monitoring and recordkeeping burden should not be imposed on such facilities. However, if a process change occurs, the facility should recalculate the TRE index value as required in Section 60.664(c) to determine whether the value remains above the TRE maximum. Sections 60.660 and 60.664 of the regulation have been amended to incorporate the requirements associated with the maximum TRE index value.

1.1.9 Definitions

Both new and revised definitions have been included in Section 60.661. New definitions for "batch distillation and operation," "continuous recorder," and "product" have already been discussed. Revised definitions for "distillation operation," "distillation unit," "total organic compounds," "process heater," "process unit," "recovery system," "TRE index value," and "vent stream" have also been included.

To further clarify the applicability of the distillation NSPS, the definition of "distillation operations" has been amended to read, "'distillation operation' means an operation separating one or more feed-stream(s) into two or more exit streams. . ." instead of two or more product streams, as stated in the proposed regulation. The definition of "distillation unit" was broadened to include explicitly the accessories necessary for some distillation operations, a vacuum pump and a steam jet. Because process heater tubes may be arranged in a number of configurations other than "tubular coils," this definition was revised to refer simply to "tubes." In order to clarify what properly constitutes a "recovery system," this definition was made more specific by referring to its purpose for recovering chemicals for use in making other chemicals, reuse, or for sale." "Vent stream" was revised to exclude explicitly equipment leaks and relief valve discharges, which are covered under VOC fugitive emission standards. The reasons for revising the definitions of "TOC" and "TRE index value" are explained in Section 1.1.4 of this chapter.

1.1.10 Net Heating Value Equation

The net heating value equation, Section 60.664(c)(4), was changed to include the heating value associated with carbon monoxide since it can contribute to the net vent stream heat content if present. The concentration of carbon monoxide in the vent stream must be determined according to ASTM D1946-82 as required under Section 60.664 (c)(2)(ii).

To be sure that the net heating value is calculated on a wet basis, the definition of symbol "C_i" (Section 60.664(c)(4)) was amended to include "on a wet basis." The net heating value must be calculated on a wet basis because the entire vent stream, including water vapor, would be combusted, and therefore this is the heating value used in calculating a TRE value.

1.1.11 Miscellaneous

Word and symbol changes were made in Sections 60.664(c) and 60.665(k)(2) to correct typographical errors.

1.2 SUMMARY OF IMPACTS OF PROMULGATED ACTION

1.2.1 Alternatives to Promulgated Action

The regulatory alternatives are discussed in Chapter 6 of the proposal background information document (BID). These regulatory alternatives reflect the different estimated number of facilities required to reduce VOC emissions by 98 weight-percent or to 20 parts per million by volume under a particular cost-effectiveness cutoff. These regulatory alternatives were used for the selection of the best demonstrated technology (BDT), considering the estimated cost impacts, nonair quality health impacts, environmental impacts, and economic impacts associated with each alternative. These alternatives have not been changed.

1.2.2 Environmental Impacts of Promulgated Action

The changes in the regulation described above will have a minor effect on the estimated air quality impacts attributed to the standards as originally proposed. The new estimated air quality impacts of the standard are presented in the Agency's notice reopening the public comment period for the proposed distillation standards (50 FR 20446). The changes in the regulation will have a negligible impact on the water quality and solid waste impacts attributed to the final standards. The analysis of environmental impacts in Chapter 7 along with the new air quality impacts presented at 50 FR 20446 now constitute the final Environmental Impact Statement for the promulgated standards.

1.2.3 Energy and Economic Impacts of Promulgated Action

Section 7.4 of the proposal BID describes the energy impacts and Chapter 9 describes the economic impacts of the proposed standards. The changes in the regulation described above will have a negligible effect on these impacts.

1.2.4 Other Considerations

1.2.4.1 Irreversible and Irretrievable Commitment of Resources. Chapter 7 of the proposal BID concludes that other than fuels required for the operation of control equipment, there is no apparent irreversible or irretrievable commitment of resources associated with the standards. The use of the TRE concept encourages the use of recovery techniques to recover chemicals for use, reuse or sale that would otherwise be disposed of as pollutants. The control of VOC emissions using recovery techniques might be an alternative for some distillation facilities. This would result in the conservation of both chemicals and fuels. The changes in the regulation described above will have no impact on the commitment of resources.

1.2.4.2 Environmental and Energy Impacts of Delayed Standards. Table 1-1 in the proposal BID summarizes the estimated environmental and energy impacts associated with promulgation of the standards. If the standards were delayed, adverse impacts on air quality could result. A delay in promulgation would mean that affected facilities would be controlled to the level specified in the appropriate State implementation plan. Emission levels would be higher than would be the case were the standards in effect because these estimated impacts have not changed since proposal.

2.0 SUMMARY OF PUBLIC COMMENTS

A total of 34 letters commenting on the proposed standards were received. A public hearing on the proposed standards was not requested. The public comment period was reopened to allow comment on the Agency's reanalysis of the total resource effectiveness (TRE) equations and coefficients, the costing procedures, and the designation of affected facility. One letter commenting on the reanalysis was received. The 35 comment letters have been recorded and placed in the docket. The list of commenters, their affiliation, and the Environmental Protection Agency (EPA) docket number for each of the comments are shown in Table 2-1. The docket reference is indicated in parentheses in each comment. Unless otherwise noted, all docket references are part of Docket Number A-80-25, Category IV. The comments have been organized into the following 11 categories:

2.1 Applicability of the Standards
2.2 Selection of Affected Facility
2.3 Definitions
2.4 Selection of Best Demonstrated Technology
2.5 Cost Estimation
2.6 Cost Effectiveness
2.7 Format of the Standards
2.8 Modification and Reconstruction
2.9 Monitoring and Measurement Methods
2.10 Reporting and Recordkeeping
2.11 General

2.1 APPLICABILITY OF THE STANDARDS

2.1.1 COMMENT: Several commenters (D-1, D-2, D-3, D-16, D-19, D-29, D-31, and D-34) requested information on the possible exemption of various organic chemicals and manufacturing processes from the proposed standards. One commenter (D-19) inquired if a distillation facility used to produce a chemical for use in the polymer manufacturing industry is exempt from the standards when it is isolated from the polymers and resins process. The

TABLE 2-1

List of Commenters on the Proposed Standards of Performance for Distillation Operations in the Synthetic Organic Chemical Manufacturing Industry

Docket Number A-80-25, IV

Letters

Addressee	Docket Reference
Mr. J. F. Cochrane Director, Environmental Affairs Department J. R. Simplot Company Post Office Box 912 Pocatello, Idaho 83201	D-1
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Mr. Gary D. Myers President, The Fertilizer Institute 1015 18th Street, Northwest Washington, D.C. 20036	D-6

TABLE 2-1 (Continued)

Addressee	Docket Reference
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Mr. G. L. Jessee Director, Regulatory Management Monsanto Company 800 North Lindbergh Boulevard St. Louis, Missouri 63167	D-12
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TABLE 2-1 (Continued)

Addressee	Docket Reference
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Mr. Paul A. Cammer Executive Director Halogenated Solvent Industry Alliance 1612 K Street, Northwest Suite 300 Washington, D.C. 20006	D-17
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TABLE 2-1 (Continued)

Addressee	Docket Reference
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Mr. A. G. Smith Environmental Affairs Shell Oil Company One Shell Plaza Post Office Box 4320 Houston, Texas 77210	D-23
Mr. Barry Christensen Environmental Manager Diamond Shamrock Chemicals Company 1149 Ellsworth Drive Pasadena, Texas 77501	D-24
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TABLE 2-1 (Continued)

Addressee	Docket Reference
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Mr. Gary D. Myers President, The Fertilizer Institute 1015 18th Street, Northwest Washington, D.C. 20036	D-29
Mr. Mark E. Lowing Environmental Specialist Dow Corning U.S.A. 3901 South Saginaw Road Mail #144 Midland, Michigan 48640	D-30
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Ms. Joyce M. Wood Chief, Ecology and Conservation Division Office of the Administrator United States Department of Commerce National Oceanic and Atmospheric Administration Washington, D.C. 20230	D-32
Mr. Jerry M. Starkey Senior Environmental Engineer Northern Petrochemical Company Post Office Box 459 Morris, Illinois 60450	D-33

TABLE 2-1 (Concluded)

Addressee	Docket Reference
Mr. Gary D. Myers President, The Fertilizer Institute 1015 18th Street, Northwest Washington, D.C. 20036	D-34
Ms. Geraldine V. Cox, Ph.D. Vice President - Technical Director Chemical Manufacturers Association 2501 M Street, Northwest Washington, D.C. 20037	D-37

commenter's question pertains to Section 60.660(a) of the proposed regulation that states distillation units operating as part of a process unit which produces polymers and resins are not affected facilities. Another commenter (D-33) asked if the term "polymers and resins" used under Section 60.660(a) refers to those specific polymers and resins which were addressed in the proposed polymer manufacturing new source performance standard (NSPS).

Three commenters (D-2, D-3, and D-31) wanted to be sure that the proposed standards are not applicable to coal tar distillation facilities and facilities that "produce" the chemicals listed in the regulation by extraction from natural substances, not by synthesis. For example, one commenter (D-31) stated that tall oil is a natural substance but contains pinene, one of the chemicals listed in Section 60.667. He asked if a distillation unit would be subject to this NSPS if the unit were to separate pinene from tall oil. One commenter (D-26) agreed with EPA for exempting the distillation operations in the beverage alcohol industry from the proposed standards.

Four commenters (D-1, D-16, D-29, and D-34) stated that urea, urea-ammonium nitrate (UAN), and ammonium carbamate production should not be covered by the standards because the production of these three chemicals neither involves the use of a distillation operation nor the significant emission of volatile organic compounds (VOC). One commenter (D-29) further stated that these compounds should not even be considered synthetic organic manufacturing industry (SOCMI) chemicals according to the EPA description of how the SOCMI list was developed (Proposed Standards of Performance for SOCMI Equipment Leaks of VOC, 46 FR 1136, January 5, 1981). The commenter believes that only one of the five criteria presented in EPA's description applies to urea, UAN, and ammonium carbamate. The one common criterion is a high production volume, and the commenter feels that it is not a sufficient reason for the three chemicals to be included on the SOCMI list. One commenter (D-16) presented information to clarify that the processes their companies use for the production of urea employ a flash evaporator which is unlike a distillation unit. Only water is removed by the flash evaporator with no significant amounts of VOC being released during urea production, in contrast to a distillation unit that separates volatile organic materials. Therefore, the commenter stated that urea production as well as UAN and ammonium carbamate production does not employ distillation units and negligible amounts of VOC are emitted. However, one commenter (D-29) indicated that distillation units are used to produce urea and any of the organic material emitted during production of urea is primarily in the form of particulates. Another commenter (D-34) indicated that if formaldehyde based additives (FBA) (used in the production of urea) were present when urea is concentrated (via distillation) only insignificant amounts of formaldehyde would be vented to the atmosphere. Because formaldehyde reacts so rapidly with urea to form a nonvolatile solid, it is unlikely that free formaldehyde would be emitted during urea production. For economic reasons, most existing facilities and all new facilities use very efficient product recovery systems. It was pointed out that all affected facilities that produce urea, UAN or ammonium carbamate would probably comply with the standards by maintaining a TRE index value greater than 1.0 because the cost of controlling VOC emissions would be above the TRE cutoff. The reasons given for the expected high TRE index values are the current and extensive use of recovery equipment and the high amounts of fuel enrichment needed for the low heating value vent streams. The commenter stated that exemptions based on the TRE cutoff would still be costly because of the required monitoring, recordkeeping and reporting.

RESPONSE: It is not the intent of the distillation NSPS to regulate the production of polymer chemicals because a polymer manufacturing NSPS is currently being developed for this purpose. However, a distillation facility that is not physically part of the polymer process line, as in the case cited by one commenter, would be covered by the distillation NSPS if chemicals listed in the regulation are produced within the process unit that contains the facility. However, when a distillation operation is an affected facility under both standards, only the polymer manufacturing standards are applicable. In order to clarify the extent of coverage by the distillation standards, Section 60.660 has been amended to defer to the polymer manufacturing standards in cases of overlapping coverage.

As noted in Section 60.660(a), coal tar distillation is not covered by these standards because these operations are covered by the national emission standards for hazardous air pollutants (NESHAP) regulating benzene emissions from coke by-product plants.

There is a small portion of organic chemicals that are extracted from natural sources. The EPA does not consider the standards to be applicable to chemicals that are extracted from natural sources because the production processes, emissions, and control alternatives have not been investigated by the Agency. Therefore, five chemicals listed in the proposed regulation that are produced by extraction from natural sources have been removed from the list. These five chemicals are: (1) coconut oil acids, sodium salt; (2) fatty acids, tall oil, sodium salt; (3) pinene; (4) tallow acids, potassium salt; and (5) tallow acids, sodium salt.

In considering the applicability of the standards to the production of the fertilizer chemicals mentioned by the commenters, EPA solicited information from many sources including the commenters themselves (Docket Item No. IV-C-7). According to the available information, including that provided by the commenters (Docket Entries IV-D-35 and IV-E-14), the Agency concluded that distillation operations are not involved in the production of ammonium carbamate and UAN. Therefore, these two chemicals have been removed from the list in the distillation regulation because the standards are not applicable to the production of these chemicals.

Although distillation operations are involved in the production of urea, EPA has removed urea from the list because no VOC emissions are expected to occur during distillation operations involved with urea production. The vent streams from these distillation units consist almost entirely of inert gases (e.g., nitrogen), water, ammonia, and urea particulate. The potential for VOC emissions would exist when FBA and/or methanol are added before or during the distillation operation. However, available information indicates that at the majority of urea production facilities, FBA is injected into the product stream after the distillation operation. Therefore, there is no potential for formaldehyde emissions from distillation units within this type of production process. For process units where FBA are injected prior to or during distillation, the only organic emissions expected from the distillation unit would be particulate urea. Any formaldehyde should be completely reacted with urea to form methylenediurea because urea is in molar excess of 125 to 1. Methylenediurea is a chemically stable compound under the conditions encountered (Docket Item No. IV-E-14).

No information was available that indicates methanol is added before or during distillation. For these reasons, the Agency has decided to remove urea from the list of chemicals covered by the final standards.

2.1.2 COMMENT: Several commenters (D-8, D-11, D-12, D-13, and D-33) requested clarification on the applicability of the proposed standards to distillation facilities that do not produce as the main product any of the chemicals listed in the regulation. One commenter (D-12) stated that it is inferred from the preamble that all economic modeling and costing was done on distillation units that distilled as a product the chemicals listed in the regulation. The commenter suggested that, if this were true, Section 60.660(a) should be modified because it includes all distillation units that are part of a system used to produce one or more of the regulated chemicals.

Several commenters (D-11, D-12, D-13, and D-15) recommended that distillation operations that produce any of the chemicals listed in the regulation at trace or low levels should be excluded from coverage by the standards. One of the commenters (D-15) suggested that exclusion should occur for distillation operations that separate inorganic or aqueous streams with only trace (less than 1 percent) organics present. Another commenter (D-11) believed that the proposed regulation would be applicable to distillation facilities that contain listed chemicals only as impurities in a process stream. Therefore, he suggested the standards state that if a process stream could be tapped and piped to a product storage vessel (even if the process is not currently so operated) and such a vessel could be filled with a product listed in Section 60.667, then the distillation process would not be exempted from the standards. The commenter indicated this wording would remove from coverage by the standards processes that only contain listed chemicals as impurities in the process streams. Two commenters (D-11 and D-12) suggested that a minimum VOC level for the vent stream be specified to determine whether a distillation operation is an affected facility. A breakpoint level of 10 percent VOC content was suggested as used in the promulgation of the standards of performance for equipment leaks of VOC in the SOCMI (48 FR 48328 - October 18, 1983).

A recommendation was made (D-13) that only those distillation units that produce one or more of the chemicals listed in Section 60.667, as products should be considered as affected facilities. Contaminants, by-products, and intermediates should not be included in the scope of these standards.

One commenter (D-8) requested clarification on the term "intermediate product" as used in the proposed standards. The commenter suggested the definition of "intermediate product" not include a manufacturing process waste or a feedstock component that is recovered by the operator for subsequent use by the operator. Feedstock components may be recovered (not "produced") during production for use in a subsequent batch. Another commenter (D-33) requested that EPA clarify whether a facility would be an affected facility if its process stream contains listed chemicals that are either sold, disposed of, used in the production of other chemicals or recycled.

RESPONSE: The EPA developed the standards from data on distillation facilities within process units that produce the chemicals listed in Section 60.667 as a product, by-product, coproduct, or intermediate. The EPA believes it appropriate to consider by-products, coproducts and intermediates as products, as indicated under Section 60.661 (Definitions), because the cost of controlling emissions from the production of listed chemicals in any of these forms is similar. Furthermore, the application of the standards to facilities producing any of the listed chemicals was found to be reasonable. Therefore, the Agency considers it appropriate for the standards to apply to any distillation facility within a process unit producing any of the listed chemicals as a product. All costing and economic impact analyses were based upon distillation facilities within process units that produce the listed chemicals as a product. However, sometimes process unit product streams contain listed chemicals that are not sold or used in reactions to form other chemicals. These types of process units were not analyzed and the distillation facilities within them are not covered by the standards. Some examples of process units that do not produce a listed chemical as a product are those in which the listed chemical is a contaminant, a feedstock that is recycled back to a process, part of a carrier gas used in another distillation operation, or a conveying gas for other process uses. Distillation operations within these types of process units would not be affected facilities.

The main factor in determining if a listed chemical is produced as a product is the use of the chemical. The EPA considers either of the following downstream uses as indicative of the production of a listed chemical as a product: (1) produced for sale as that listed chemical, or (2) used in another process that needs the listed chemical. An example of (2) is when methanol, a listed chemical, is produced not for sale but to react with carbon monoxide to produce acetic acid. However, if a listed chemical is only part of a mixed stream exiting a process unit and cannot be sold or used in another process as the listed chemical, then that listed chemical is not considered to be produced as a product. For example, cyclohexane, a listed chemical, may be present in a product stream exiting a distillation facility within a process unit that only produces gasoline. Because the gasoline would not be sold or used in a downstream process for the cyclohexane only, the distillation facility would not be covered by the standards. Therefore, a distillation operation is an affected facility only if it is within a process unit that produces a compound to be sold as a chemical listed in Section 60.667 or used in a process that needs a chemical listed in Section 60.667 for the production of chemical(s) in another process unit.

Listed chemicals can be formed as contaminants from side reactions as a consequence of producing other chemicals that are not listed, or by fractionating feedstocks with small amounts of listed chemicals. These contaminants would not be considered to be produced by the process unit if they are not fractionated further to be sold or used in the production of a final product.

Another case is when listed chemicals are separated from a reactor product stream in a distillation operation and recycled back to the reactor as an unreacted feedstock. For example, a low-yielding reaction occurs where the reactants A and B are listed chemicals and are reacted to form a product

C that is unlisted. A distillation operation is used to separate chemical C from the unreacted chemicals A and B. Chemicals A and B are then recycled back to the reactor. The distillation operations within this process unit would not be covered by the standards because chemicals that are not produced, but are feedstock chemicals that are recovered for reuse, are not considered products. However, if these distillation operations were within a process unit manufacturing a listed chemical as a product, it would be covered.

Another example of a case where the standards would not apply is when the noncondensibles from a distillation overhead are used as a carrier gas to facilitate the operation of another distillation operation or as a conveyor gas for other process uses. If the carrier gas contains any listed chemical(s) and is a process stream from a process unit used to produce an unlisted chemical, then the standards would not apply to this facility.

The EPA has decided that for the purposes of these standards it is more appropriate to determine applicability according to whether a listed chemical is produced as a product, instead of setting a minimum concentration level of a listed chemical as a means of defining what may constitute production as a product. It is not feasible to set any one concentration limit for listed chemicals below which the chemical is always an impurity or waste. It is not feasible because the necessary concentration or purity for a listed chemical to be considered a product can vary from site to site. For example, a chemical that is produced as 90 percent pure from one process may only be 80 percent pure to be considered as a product for another process. If EPA attempted to establish different concentration limits for all of the processes covered by the standards, the complexity and resource requirements would be extremely prohibitive because of the diversity of the SOCMI. Therefore, the applicability of the standards is determined according to whether a listed chemical is produced as a product. Section 60.661 has been amended to include more specific definitions of product, coproduct, and by-product in order to clarify the applicability of the standards.

2.1.3 COMMENT: Several commenters (D-4, D-7, D-14, and D-18) requested clarification of the proposed standards with regard to the applicability of petroleum refineries producing any of the chemicals listed in the regulation. One commenter (D-18) stated that because the information used to develop the standards is limited to the organic chemical manufacturing industry, the standards should not apply to distillation units in petroleum refineries. Several commenters (D-4, D-14, and D-18) pointed out that many refinery product streams contain complex mixtures with trace amounts of the chemicals listed in Section 60.667 of the regulation. Two of these commenters (D-14 and D-18) stated that the standards should only apply to those processes that produce the listed chemicals in pure or nearly pure form. It was recommended the standards specify a minimum level for the quantities of the listed chemicals in a process stream or distillation unit that would cause a distillation facility to be subject to the standards. It was suggested that streams having less than 10 percent of any of these listed compounds should be exempt from the standards.

Two commenters (D-7 and D-13) noted that the background information document (BID) (page 9-43) indicates chemicals produced primarily by refineries are assumed to incur no costs as a result of the standards. Both commenters stated that an increase in chemical cost would occur if petroleum refineries must meet the standards.

RESPONSE: The standards were developed to apply to any distillation facility within a process unit producing the chemicals listed in Section 60.667 for sale or for use in the production of other chemicals (see comment 2.1.2). The primary purpose of most petroleum refineries is the production of petroleum products such as motor fuels. However, some refineries are involved in producing one or more synthetic organic chemicals. The EPA believes that the standards appropriately apply to distillation facilities in the petroleum refineries that produce the listed chemicals.

The Agency evaluated data on organic chemical manufacturing including that done at petroleum refineries, in developing this NSPS. The EPA has found that distillation facilities within petroleum refineries do not vent directly to the atmosphere. Instead, these facilities have their vent streams recycled, routed to recovery, used as a fuel, or combusted by flaring or incineration. In February of 1981, the American Petroleum Institute (API) sent comments concerning Chapters 3 through 6 of the BID to EPA (Docket Item No. II-D-182). In these comments API agreed with the statement in the BID that refinery distillation vent streams are already well controlled, recycled, or completely recovered. The API further indicated that additional redundant controls would not be necessary. However, EPA considers it advantageous to regulate a segment of the industry that is already well controlled in order to ensure those controls are properly operated and maintained and to guarantee they will be applied to all facilities yet to be constructed. Another advantage in regulating these facilities is to ensure that a consistent level of control is maintained for all States. The EPA recognizes that there will be costs associated with compliance testing, monitoring, recordkeeping, and reporting for verification of compliance with the standards but these costs were found to be reasonable.

Although the Agency believes that existing distillation facilities within refineries are already well controlled, it is possible that a few new refineries may be built with uncontrolled vent streams. However, these vent streams would only have to be controlled if EPA determines the cost effectiveness of combustion to be less than $1,900/Mg. Therefore, the Agency has determined that any control costs incurred by petroleum refineries as a result of this NSPS would be reasonable.

Commenter D-13 was contacted for clarification of a comment regarding an increase in chemical costs resulting from the NSPS. She stated that the comment assumed that relief valve venting would be subject to control under this NSPS and, in that case, additional costs would be incurred. Relief valve discharges are not covered by the distillation NSPS. For a discussion of this issue refer to the response to comment 2.3.1.

2.1.4 COMMENT: One commenter (D-11) stated that distillation facilities starting up after promulgation of the standards have 180 days to attain compliance and that facilities starting up between the proposal and promulgation should be given the same consideration. The commenter requested that the initial reporting, performance test, and recordkeeping requirements be required no sooner than 180 days after promulgation of these standards.

RESPONSE: The General Provisions (40 CFR 60.8) specify that a performance test be conducted at an affected facility no later than 180 days after the initial startup of the facility. Even though the standards apply to facilities commencing construction, reconstruction, or modification after proposal (December 30, 1983), EPA does not require an immediate performance test and written report to the Administrator. Once the standards are promulgated, all affected facilities that were built between proposal and promulgation will be given a reasonable amount of time of demonstrate compliance. Any affected facility starting up after promulgation will have 180 days from their initial startup to conduct a performance test. A written report must then be submitted to the Administrator.

2.1.5 COMMENT: Three commenters (D-9, D-11, and D-27) inquired about the low vent stream flow rate and design capacity exemptions specified in the standards. Two commenters (D-11 and D-27) requested that a wording change be introduced into the existing low flow rate exemption that would allow distillation facilities operated with a maximum vent stream flow rate of less than 0.008 m^3/min to be exempt. Section 60.660(d) of the regulation exempts any distillation facility which is designed with a maximum vent stream flow rate of less than 0.008 m^3/min from meeting the specifications in this subpart, except for recordkeeping requirements. The commenters indicated the designed vent stream flow rate is usually different from the operated flow rate. With the requested wording change, distillation facilities could operate with vent stream flow rates below 0.008 m^3/min and not become subject to the standards. This could be done even if the design flow rate were higher. Since vents are typically designed to accommodate emergency conditions, the operating flow rates are usually lower than designed flow rates. The additional wording would also clarify any ambiguity over vents that were designed for 0.008 m^3/min but are operated at higher rates.

One commenter (D-9) noted that it is not clearly stated in Section 60.660(c) that the 1 Gg/yr design capacity exemption refers to the total amount of product from the distillation facility or that portion of the total products which is a chemical listed in Section 60.667.

RESPONSE: The Agency recognizes that some distillation facilities may operate with vent stream flow rates above or below their designed level. Therefore, EPA has decided to amend the regulation to exempt from coverage by the standards, except for recordkeeping and reporting requirements, those distillation facilities that operate with a vent stream flow rate less than 0.008 m^3/min. The Agency will no longer continue to exempt distillation facilities only because they were designed for a vent stream flow rate below 0.008 m^3/min. To ensure the flow rate is continuously operated below 0.008 m^3/min, the owner or operator must demonstrate it to EPA. The owner or operator of an affected facility that operates with a vent stream flow rate below 0.008 m^3/min must notify EPA and demonstrate compliance with a performance test that measures the operating flow rate. Furthermore, any operational changes in the facility that may cause the vent stream flow rate to no longer be below the exemption level must be recorded along with a flow rate measurement after the change has been made. No reporting to EPA is required until the low flow level has been exceeded and the report must contain the new flow rate measurement. The following are a few examples of operational changes that could affect the vent stream flow rate: increased production or production capacity, use of a new feedstock, use of a new catalyst, or any replacement, removal or addition of recovery equipment, or changes in the operating characteristics of the distillation unit(s). If any of these operational changes result in a flow rate greater than the exemption level, they must be reported to EPA semiannually along with the new flow rate. Otherwise, there are no reporting requirements after the initial performance test. If the vent stream flow rate exceeds the exemption level, the owner or operator must comply with the provisions of Section 60.662.

The low capacity exemption does not pertain only to the production of chemicals listed in Section 60.667. The EPA exempts any distillation facility from coverage by the standards, except for recordkeeping and reporting requirements, when the process unit has a total design capacity less than 1 Gg/yr (2.2 million lbs/yr) of all products manufactured by that process unit. This includes all listed and unlisted chemicals. In order to clarify the meaning of this exemption, Section 60.660(c) has been amended to read "... total design capacity less than 1 Gg/yr ....".

As required under Section 60.665(i), recordkeeping is needed only for changes in process operation that increase the design production capacity of the process unit containing the affected facility. Furthermore, semiannual reporting is required under Section 60.665 (l)(6) only when these process changes occur (see comment 2.10.2).

The EPA has decided to exempt process units with production capacities lower than 1 Gg/yr from this NSPS because units of this size that produce a listed chemical are typically used for research and development. Because best demonstrated technology (BDT) was analyzed with respect to industrial scale facilities and because the operation of research and development scale facilities is different, BDT may not be applicable.

2.1.6 COMMENT: Two commenters (D-12 and D-24) requested that the applicability date of the standards cited in Section 60.660(b) be changed from December 30, 1983, to the date that the final rule is promulgated. It was stated that any plants which start construction before the rule is promulgated do not have a defined, final set of standards for design of their distillation system.

RESPONSE: The EPA plans no change in the applicability date of the standards as stipulated in Section 60.660(b). (Section 111(a)(2) of the Clean Air Act (CAA) defines new sources as those that commence construction after proposal). This date marks the time after which a distillation facility may be considered an affected facility. However, compliance is not required until after the promulgation date to allow for the final rule to first be established before the compliance period begins. As noted in the response to comment 2.1.4, all facilities that start up between proposal and promulgation have a reasonable time after promulgation to demonstrate compliance with a performance test. Furthermore, although subject to change, the proposed standards provide an indication of what will be contained in the final standards.

2.1.7 COMMENT: Several commenters (D-8, D-11, D-20, and D-22) stated that the proposed standards do not seem to adequately treat the complex nature of batch operations. These commenters suggested the standards be applied on a case-by-case basis for batch distillation systems because the vent streams from these operations often have variable characteristics. For example, batch vacuum distillation may have an initial higher vent stream flow rate as noncondensibles are removed from the products being purified followed by very low emissions for most of the cycle. The commenter stated that application of a recovery system for compliance with a TRE greater than 1.0 is likely to represent greater difficulty and cost impact on batch distillation facilities than anticipated by the Agency.

RESPONSE: The EPA has decided to exclude batch distillation operations from this NSPS because BDT was evaluated with respect to continuous operations which have relatively constant vent stream flow rates and compositions within a process unit. Batch distillation typically emits a vent stream of variable flow rate and composition during its operation. As a result, BDT may not be applicable to vent streams from batch processes. The Agency is currently investigating the need for an NSPS for batch processes within the SOCMI separately from this NSPS.

Section 60.660 has been revised to specifically exempt batch distillation operations. The following definition has been added to Section 60.661: "'Batch Distillation Operation' means a noncontinuous distillation operation in which a discrete quantity or batch of liquid feed is charged into a distillation unit and distilled at one time. After the initial charging of the liquid feed, no additional liquid is added during the distillation operation."

2.1.8 COMMENT: Four commenters (D-9, D-17, D-24, and D-25) called for the exclusion of certain chemicals listed in Section 60.667 that are considered to be low in photochemical reactivity. The commenters stated the listing of five chemicals in the regulation is inappropriate because these chemicals also appear in the list of chemicals determined to be negligibly photochemically reactive by EPA (48 FR 57541) and thus are not considered to be VOC. The commenters list the chemicals in question as the following: dichlorodifluoromethane; methylene chloride; trichlorofluoromethane; trichlorotrifluoroethane, and 1,1,1-trichloroethane.

In addition to the five nonphotochemically reactive chemicals listed by EPA in the regulation, two commenters (D-17 and D-24) requested the removal of perchloroethylene from the list of chemicals in Section 60.667. The commenters indicated that EPA has previously designated this chemical as a negligibly photochemically reactive compound that does not contribute to ambient ozone formation.

RESPONSE: The production of chemicals of negligible photochemical reactivity does not preclude the presence of photochemically reactive compounds in the vent streams of these facilities. For example, chlorinated organics (e.g., perchloroethylene) which are considered to be photochemically reactive can be present in the process vent streams from the production of chlorofluorocarbons. Thus, EPA plans no change in the list of chemicals covered by the the standards.

In any event, with respect to perchloroethylene, the Agency has only proposed that perchloroethylene be considered as a negligibly photochemically reactive compound (48 FR 49097). As discussed in responses to comments 2.7.1 and 2.7.2, negligibly photochemically reactive compounds are allowed to be subtracted from the TOC emission rate used to calculate the TRE index. However, perchloroethylene cannot be subtracted because its status has not been promulgated.

2.2 SELECTION OF AFFECTED FACILITY

2.2.1 COMMENT: Seven commenters (D-8, D-11, D-13, D-20, D-22, D-23, and D-27) disagreed with the designation of affected facility used in the proposed standards. At proposal, the Administrator designated the affected facility as a single distillation unit with the associated recovery devices located within the process units which produce any of the chemicals listed in Section 60.667. Other possible designations were also mentioned at proposal and EPA specifically solicited comments concerning the proposed designation of affected facility. The commenters indicated that the proposed designation of affected facility is unrealistic and unrepresentative of the way distillation units are operated within the industry. According to the commenters, distillation units are often physically linked together and to artificially separate them would be inappropriate. The commenters pointed out that many processes consist of a series of distillation units and in some cases, units receive, as feedstreams, the product streams of other units. Under these conditions several units can use a common recovery device. They concluded that in these cases, application of VOC reduction requirements and monitoring methods under the proposed designation of affected facility would be potentially confusing and costly.

The commenters prefer an affected facility to be designated as the recovery system with all associated distillation units. The commenters indicated that this designation would best reflect the way distillation units are used within the industry. Also, ambiguities in monitoring and testing requirements would be minimized when more than one distillation unit is tied to a common recovery system. Overall, the commenters felt that this designation would reduce monitoring, control, and hardware costs incurred by affected distillation facilities. Furthermore, the commenters expressed that differences between emission reductions resulting from the EPA designation of affected facility and the designation preferred by the seven commenters would be small, if any.

The commenters stated that the broader affected facility designation would allow a facility the flexibility to change operating conditions or equipment in lieu of adding combustion devices. For example, the owner or operator of an affected facility may reduce emissions in existing distillation units to offset increased emissions from new or modified distillation units that become part of the facility. If this compensation is made, there would be a zero net increase in emissions from the affected facility. Therefore, no adverse environmental impact would result, yet economic and energy conserving changes at a facility could be made.

One commenter (D-15) is in favor of the selection made by EPA because this commenter believes the approach will allow for continuous improvement of the air quality which is the intent of the standards. Another commenter

(D-21) indicated that the definition of affected facility contained in the proposed regulation conforms with the requirements of the CAA insofar as it does not allow two or more distillation units which are joined to a common recovery system to be interpreted as one facility.

RESPONSE: Based on these comments, the Agency reevaluated the designation of affected facility and presented the results of the reevaluation in the Federal Register on May 16, 1985 (50 FR 20446). Based on those results and the lack of adverse comment on that reevaluation, the designation has been changed from a single distillation unit with the associated recovery system to an individual recovery system and all distillation units venting to that recovery system. For the majority of the industry, this change will have no effect because approximately 80 to 90 percent of the industry's distillation units exist as individual units. However, the effect of the designation change will be seen for the remaining 10 to 20 percent of the distillation units that share recovery devices. This change was not made to provide industry with operating flexibility; rather the new designation is estimated to result in greater emissions reduction. Also, as discussed at the end of this response, the new designation would facilitate the implementation of the standards because, in some cases, the cost and complexity associated with determining a TRE index will decrease.

The EPA estimates a greater reduction in national VOC emissions because of the change in designation of affected facility. Greater reduction in emissions will occur with the new designation because for facilities where the TRE is less than 1.0, emissions from existing distillation units will also be controlled when new units are combined with existing units sharing a common recovery system. The Agency believes that a widespread evasion of the modification provisions would not occur under this designation. For example, a change that would be considered a modification is made to one distillation unit within a group of existing units. In order to avoid a modification, the common recovery system is upgraded so that no emissions increase results. However, operational or physical changes that would be considered modifications are rarely made to individual distillation units sharing a recovery device. Instead, it is more likely that new distillation units would be added to an existing group of units resulting in increased emissions.

In the event an owner added a distillation unit to an existing group of units ducted to the same recovery system, it is unlikely the facility could avoid being considered a modification by offsetting the new distillation unit emissions somewhere else within the distillation group. This is because it would likely be technologically infeasible to reduce emissions sufficiently from the other distillation units. Although some VOC reductions could occur through upgrading recovery equipment, it is unlikely that this reduction would result in a full offset of the new distillation emissions unit because the increased load on the recovery device (i.e., increased flow and VOC) would make the needed increase in VOC removal efficiency difficult to achieve. Thus, the likely result is that addition of a distillation unit to a group of joined units would bring the entire set under the coverage of the standards as a modified facility. Even though it is unlikely to occur, if the owners or operators of the facility could completely offset emissions from a new distillation unit by upgrading the recovery system, it would be the equivalent of 100 percent VOC control for that new distillation unit. This is 2 percent more than would be necessary if the individual units were designated as affected facilities and 98 weight-percent control were applied.

The EPA believes that coverage of equipment through the reconstruction provisions will not be avoided under the broad designation because major physical changes (i.e., reconstructions) to individual distillation units within a group of units rarely occurs within the industry. It is not likely that an owner or operator of an affected facility made up of a group of distillation units could replace one of the units and avoid being considered a reconstruction. Available data show this situation would not arise because the replacement of the individual distillation units or pieces of recovery equipment is rare within the industry. This is because distillation units are expensive pieces of equipment which are designed to last a long time (Docket Item No. II-B-13). Moreover, the Agency has concluded that those few replacements which do occur often result from process changes or catastrophic events that would probably require replacement of most of the group of distillation units joined to a single recovery system. These changes would likely amount to a "reconstruction" of the facility as it is defined in these standards. Thus, in the small percentage of cases where distillation unit replacements occur, the facility would most likely fall under the coverage of the standards.

An incidental effect of this change in the affected facility designation is that implementation of the standards would be made significantly easier. When two or more distillation units are joined to a common recovery system, determining a TRE index value is less complex and less costly because fewer test sites are required to measure the vent stream characteristics needed to calculate a TRE index value. Under the designation of these standards set forth at proposal, it was required only that the portion of the combined vent stream contributed by the new, modified or reconstructed distillation unit comply with the standards when it shares a recovery system with existing units. Therefore, the TRE index value was determined for the portion of the stream contributed by that unit only. This determination was complex and costly and was based upon an apportioning method using sampling sites located just downstream of the new unit and sampling sites located upstream and downstream of the common recovery system. These sampling data were to have been used to determine the overall efficiency of the common recovery system. This efficiency was then to have been applied to the vent stream of the new unit to determine its contribution to the total emissions from the common recovery system.

Under the new designation, the standards require only one sampling site located after the last recovery device to determine a TRE index value. No determination of recovery efficiency is needed in this case because the entire vent stream is covered. Therefore, there is no need to determine which portion of the final vent stream from a group of distillation units is attributable to new, modified, and reconstructed distillation units and which portion is attributable to distillation units that have not been changed or added. This results in a performance test requirement that is less costly and less complex because fewer sampling sites and subsequent analyses are needed.

2.3 DEFINITIONS

2.3.1 COMMENT: Three commenters (D-8, D-13, and D-33) proposed modifications of the definition for "vent stream" in Section 60.661 where the term is designated to mean any gas stream released to the atmosphere from any distillation unit. Two of the commenters (D-8 and D-33) expressed that equipment leaks should be clearly excluded from the definition so that the wording would apply only to VOC-containing streams. Two commenters (D-13 and D-33) requested that the definitions of "vent stream" be made less broad so as to exclude relief valve discharges. The commenters added that equipment leaks and relief valve discharges are already covered by other NSPS.

RESPONSE: This NSPS is not concerned with regulating equipment leaks or relief valve discharges of VOC. These sources are regulated by an NSPS for fugitive emissions in the SOCMI (48 FR 48328). In order to clarify the meaning of "vent stream" as used in this regulation, the Agency has amended Section 60.661 as follows: "vent stream" means any gas stream released to the atmosphere from any distillation facility excluding equipment leaks and relief valve discharges.

2.3.2 COMMENT: One commenter (D-19) asked if the definition of distillation operations excludes those distillation units that have one product stream. The definition of "distillation operations" in Section 60.661 of the proposed regulation states that one or more feed-stream(s) are separated into two or more product streams during a distillation operation. The commenter also inquired about still bottoms being considered as a product stream according to this definition.

RESPONSE: The number of product streams exiting a distillation unit would not be used to determine if it would be an affected facility. As indicated in Section 60.660(a), the standards are applicable to any distillation facility operating as part of a process unit producing any of the chemicals listed in Section 60.667 as a product. Even if a listed chemical were not produced as a product by a distillation unit, that unit would be affected by the standards if it were part of a process unit producing a listed chemical as a product. A discussion concerning the meaning of "product" for the purposes of this NSPS is given in the response to comment 2.1.2. To further clarify the applicability of the distillation NSPS, the definition of distillation operations in Section 60.661 has been amended to read "'distillation operation' means an operation separating one or more feedstream(s) into two or more exit streams . . . within the distillation unit."

In order for still bottoms or any other stream exiting a distillation unit to be considered a product, the stream must contain a chemical listed in the regulation. Furthermore, the stream must either be sold as that listed chemical or used in another process requiring that listed chemical.

2.3.3 COMMENT: Two commenters (D-11 and D-12) stated that since some process heaters may transfer heat to process fluids not contained in tubular coils, any definition of process heater should not include a reference to tubular coils. Therefore, both commenters suggested that the reference to "tubular coils" be eliminated in the definition of "process heaters" in Section 60.661 of the regulation.

RESPONSE: The Agency agrees that some process heaters do not have tubular coils, but instead have straight-tube or U-tube arrangements. Thus, to further clarify the definition of "process heaters," Section 60.661 has been amended so that "tubular coils" is replaced by "tubes."

2.3.4 COMMENT: One commenter (D-27) stated that "TOC" as used in the preamble is a poor abbreviation for total organic compound. The meaning for "TOC" is more commonly taken to be total organic carbon.

RESPONSE: Because there is no reference to total organic carbon in the preamble or regulation, the Administrator feels that "TOC" is not an ambiguous abbreviation for the purposes of this NSPS. Furthermore, the term total organic compound is clearly defined in the beginning of the regulation.

2.3.5 COMMENT: One commenter (D-19) stated that the definition of "corrosive vent stream" in Section 60.661 is not clear. The commenter was uncertain whether EPA means streams containing the equivalent of 20 parts per million by volume (ppmv) halogens or 20 ppmv halogen-bearing compounds are corrosive. The commenter stated that the use of a 20 ppmv halogen-bearing compound limit could result in a significant range of halogen concentrations in the incinerator flue gas depending on the percentage of halogen in the compound.

RESPONSE: The EPA considers a vent stream to be corrosive when the stream concentration of halogen-bearing compounds is 20 ppmv or greater. The Agency is aware that even small amounts of halogenated compounds may be corrosive and can necessitate the use of an incinerator with a scrubber system. It was judged that this 20 ppmv concentration is low enough to account for this situation, even if many halogen atoms are attached to one compound (e.g., carbon tetrachloride). Therefore, the control cost and TRE were not underestimated for any facility.

In order to be consistent throughout the regulation, the phrase "corrosive vent stream" in Section 60.661 (Definitions) has been changed to "halogenated vent stream." However, the definition for halogenated vent stream will remain the same as the earlier corrosive vent stream definition.

2.4 SELECTION OF BDT

2.4.1 COMMENT: One commenter (D-24) requested clarification on whether BDT for the proposed standards would qualify as a best available control technology (BACT) or lowest achievable emission rate (LAER).

The commenter also stated that NO_x emission increases resulting from the combustion of process vent streams could bring combustion sources under BACT review in attainment areas. In light of this, the commenter suggested that EPA review the impact on costs associated with NO_x emission increases from flares, boilers, and incinerators.

RESPONSE: The BDT for the standards will be considered in defining BACT or LAER in each plant-specific evaluation. The evaluation encompasses a consideration of emissions such as SO_2 and NO_x as well as VOC emissions. There are situations, however, where the emissions reduction required for a pollutant under BACT or LAER may be greater than that which results from the NSPS. The BACT is defined in Section 169(3) and LAER is defined in Section 171(3) of the CAA.

Any NO_x emissions increase resulting from the combustion of distillation vent streams under the NSPS are not expected to be great enough to bring the combustion sources under BACT review in attainment areas. A distillation facility under BACT review would be required to control its NO_x emissions if an increase in NO_x of 40 tons per year or more occurred as required under 40 CFR 51.24(B)(23)(i). In order to estimate the likelihood that a 40 ton per year increase in NO_x emissions would occur as a result of vent stream combustion of VOC emissions, two analyses were performed (Docket Item No. IV-B-16). Typically, distillation vent streams in SOCMI contain non-nitrogenous VOC compounds. One analysis was done for a facility with non-nitrogenous VOC compounds in the vent stream. This analysis maximized potential NO_x emissions from an example facility by using the highest flow rate vent stream found in the available emissions data along with a high VOC concentration. The total amount of NO_x as NO_2 estimated by this analysis is less than 10 tons per year. An additional analysis was performed for the few cases where the vent stream does contain nitrogenous compounds. For this analysis the highest vent stream flow rate was also assumed and it was assumed that this vent stream contained a high concentration of nitrogenous compounds. The total amount of NO_x as NO_2 estimated for this case is less than 30 tons per year. Thus, analyses show that the combustion of vent streams from the production of a listed chemical would not be expected to require the control of NO_x under a BACT review. Therefore, costs associated with NO_x control will not be examined for this NSPS.

2.4.2 COMMENT: Eleven commenters (D-5, D-7, D-11, D-12, D-13, D-14, D-19, D-22, D-23, D-24, and D-27) are concerned that the flare specifications listed in the proposed standards for combustion of process vent streams are too strict. The specifications set a minimum heating value at either 11.2 MJ/scm (300 Btu/scf) or 7.45 MJ/scm (200 Btu/scf) (depending upon the type of flare) and an exit velocity of less than 18 m/sec (60 ft/sec). Commenters (D-5 and D-22) suggested that whatever changes are made to the flare specifications under the standards of performance for SOCMI equipment leaks of VOC (48 FR 48328 October 18, 1983) should also be applied to this proposed NSPS to maintain consistency.

Various reasons were given by the commenters why EPA should reconsider using the flare specifications now listed as part of the distillation standards. Four commenters (D-7, D-12, D-22, and D-24) stated that little data and not a broad enough range of test conditions were used to establish the specifications. It was also stated that the technical basis for the specifications should be explained. Commenters (D-7, D-11, D-12, and D-23) asserted that flares at higher velocities provide highly effective VOC control. One commenter (D-27) stated that the vent stream minimum heating value requirement for flame stability should be 150 Btu/scf, instead of the 300 Btu/scf in the proposed standards. Another commenter (D-19) remarked that the EPA flare specifications on flare gas velocity and Btu content are not reasonable and should be shifted to a performance based standard. The commenter felt that the presence of a suitable flame should be the main indicator of an efficient flare.

Several commenters were concerned that the specifications would have negative effects upon the cost and operation of flares. Two commenters (D-11 and D-13) noted that the use of advanced technology flares such as some Linear Relief Gas Oxidizers (LRGO) would be precluded by the velocity restrictions. Other commenters (D-13 and D-23) stated that normal and emergency venting for pressure relief would be hindered by the flare maximum velocity specification. Both commenters requested a provision for the waiver of the maximum velocity of 60 ft/sec during periods of emergency pressure relief. Three commenters (D-7, D-11, and D-33) stated that the proposed flare specifications would have a large economic impact on some existing facilities that would come under the regulation of these standards. These plants already use flares designed and operated at velocities considerably higher than the 60 ft/sec specification. Two of the commenters (D-11 and D-33) stated that construction of new flares to meet the velocity restrictions will be costly and in many cases completely infeasible.

One commenter (D-14) remarked that it should be possible to show that a velocity lower than 60 ft/sec combined with a lower Btu content than either 300 or 200 Btu/scf (depending upon the flare type) would lead to a reduction efficiency of at least 98 percent. It was noted the standards as written do not give proper credit for control devices prior to flares, such as vent gas scrubbing systems that cause the vent stream heating value to decrease due to the removal of organics. The commenter indicated that it may be unnecessary to add natural gas to scrubbed vent streams if an exit velocity less than 60 ft/sec were used.

One commenter (D-27) requested an extension of the comment period so they could review the Energy and Environmental Research report on flares prepared for EPA.

RESPONSE: Because of the technical infeasibility of testing for the VOC reduction efficiency of flares, EPA determined it necessary to set operational specifications to ensure 98 weight-percent reduction efficiency. The original specifications were based upon the best data available at the time of proposal. Based on new data on flare performance obtained since proposal, EPA developed revised flare operating specifications and proposed these specifications on April 16, 1985 (50 FR 1494). After receiving public comments on the revised specifications, they were finalized and incorporated into 40 CFR 60.18 of the General Provisions (January 21, 1986, 51 FR 2699). During this period the commenters were given opportunity to review the new study on the efficiency of flares and to comment on the study and the revised operating specifications.

Two commenters noted that LRGO flares could not be used with the 60 ft/sec exit velocity limitation. The EPA does not have sufficient data to evaluate the reduction efficiency of LRGO flares at exit velocities greater than 60 ft/sec. However, the Agency will evaluate any data submitted by the

SOCMI to demonstrate the 98 percent reduction efficiency of LRGO flares. If these flares are judged to be capable of achieving 98 percent reduction efficiency then they could be used in complying with the standards.

Two commenters requested a provision for the waiver of the maximum velocity of 60 ft/sec during periods of emergency pressure relief. Emergency venting is considered a malfunction and allowed under these standards and there is no need for a waiver. However, records must be kept of each occurrence and its duration as required under Section 60.7(b) of the General Provisions. Recordkeeping is required so that EPA will be able to determine how many malfunctions are occurring and then be able to determine if the device is being properly operated and maintained.

Two commenters stated that the exit velocity limitation of 60 ft/sec when the gas stream heating value is less than 1,000 Btu/scf could necessitate the replacement of existing flares designed and operated with velocities greater than 60 ft/sec. However, EPA believes existing facilities coming under the regulation of the standards would not have to completely replace these flares. Instead of building a new flare, only the existing flare tip and some auxiliary equipment would have to be changed to accommodate the 60 ft/sec limitation. Considering that many components of the existing flare could still be used, EPA has judged the cost of modifying an existing flare to be well below the cost estimated to construct an entire flare. Furthermore, the cost of constructing a new flare was found to be reasonable, and the TRE equations are based on new flare costs. Therefore, the cost impacts for facilities which choose to control VOC by modifying an existing flare should also be reasonable.

The requirement that vent streams to be flared have a heating value of at least 300 Btu/scf, if air or steam assisted flares are used, is necessary because available data show that for some flares, flame stability and 98 percent emissions reduction cannot be consistently maintained below a heating value of 300 Btu/scf. Furthermore, it is important to maintain the flare specifications and not only rely on the presence of a flame, as suggested by one commenter. Data indicate that some flares with a visible flame can not achieve a reduction efficiency of 98 percent (Docket Item No. IV-A-1).

Another commenter requested that specifications for velocities lower than 60 ft/sec be provided and that lower fuel requirements be specified for these velocities. However, the current available data do not indicate that an emissions reduction of 98 percent or greater can be constantly maintained at heating values below 300 Btu/scf or 200 Btu/scf depending on flare type and exit velocities lower than 60 ft/sec.

2.4.3 COMMENT: One commenter (D-10) stated that catalytic oxidation can be an attractive alternative to thermal incineration. He indicated that although catalytic oxidation can be designed for high VOC reduction efficiencies, economic factors dictate whether these levels are practical. The commenter added that the 98 percent reduction efficiencies associated with the proposed standards would possibly require the use of uneconomically large catalyst volumes in catalytic incinerators or require the use of thermal incinerators. The commenter pointed out that 98 percent reduction efficiency may not result in a measurable improvement in the environment over the case of catalytic oxidation at an efficiency slightly lower than 98 percent. Furthermore, the use of thermal incineration may potentially entail the following detrimental effects: (a) higher energy usage by the affected facilities; (b) an increase in NO_x emissions from the affected facilities using thermal incineration; and (c) a decrease in the international competitive position of domestic chemical producers with respect to foreign competition.

RESPONSE: The EPA has determined that, where catalytic oxidation units are applicable, they can achieve 98 weight-percent reduction efficiency. However, since using catalytic oxidation for VOC emissions reduction has not been demonstrated to be universally applicable for all distillation process vent streams, catalytic oxidation was not evaluated by the Agency. Catalytic oxidizers are limited by their inability to handle streams with high heating values because deactivation of the catalyst occurs at high temperatures. Catalysts can also be deactivated by compounds present in some waste streams, such as arsenic, sulfur, mercury, lead, zinc, or tin.

The Agency evaluated two control techniques universally applicable within the industry, thermal incineration and flaring. The Agency examined emissions data from incinerators and flares already operating within the industry, as well as incinerator and flare tests conducted by the Agency and by chemical companies. All the new, well-operated incinerators and flares were found to achieve 98 percent reduction efficiency. From the available data the Agency determined many facilities could achieve 98 percent reduction efficiency at a reasonable cost using thermal incineration and flaring. The Agency has bounded the cost impacts associated with combustion devices by costing the most expensive devices: thermal incinerators and flares. Costs associated with these devices were found to be reasonable for facilities with TRE index values less than 1.0. Therefore, if a stream does exist whose constituents are such that a catalytic oxidizer is not applicable or if the cost of using a catalytic oxidizer is too high for a particular situation, a flare or thermal incinerator can be used.

When evaluating the economic effects of this NSPS, EPA calculated the maximum chemical price increases that could be expected as a direct consequence of the standards. Because these "reasonably worst-case" price increases were quite small, EPA can be sure there will be no significant, unexpected, harmful economic effects associated with the standards. To be sure, price changes are not the only economic effects of an NSPS, but if potential price changes are small, there is no reason to suspect that the NSPS might trigger significant changes in profits, interest rates, industry growth, employment, production, competition, foreign trade, and related economic variables. In general, firms will not build, modify, or reconstruct production facilities until a reasonable return can be expected on the investment, including the investment in pollution control. If the cost of pollution control is not offset by improvements in reactor catalysts, marketing economies of scale, etc., then firms may delay construction plans for a short period until prices rise to cover the pollution control costs.

The commenter is particularly concerned that EPA, by not allowing catalytic incinerators to substitute for thermal incinerators, will create a competitive disadvantage for U. S. plants vis-a-vis foreign competition. However, the Agency is not preventing the use of catalytic incinerators. They may be used if the emission reduction requirements are satisfied. Furthermore, if an owner or operator chose to use a thermal incinerator, no economic disadvantage should be created vis-a-vis foreign competition. Using reasonable control estimates, chemical price increases are expected to range from 0 to about 4 percent.

The energy and environmental effects mentioned by commenter D-10 were considered in selecting thermal incineration as one of the control techniques upon which the impacts of the standards are based. The energy consumption and cost associated with thermal incineration were considered and found to be reasonable because these can be offset by the use of recuperative heat exchangers. The potential for increased NO_x emissions was also examined, but the rate of NO_x formation is expected to be low due to relatively low combustion temperatures and relatively short residence times associated with thermal incineration.

2.4.4 COMMENT: A request was made concerning the use of control techniques other than combustion. One commenter (D-12) stated that industry should be allowed to use switching condensers for control of VOC emissions if 98 percent reduction of VOC is achievable. A switching condenser operates such that the condensate is removed by freezing on the heat exchanger surface, and would probably work effectively in general VOC control service.

Another commenter (D-21) stated that the consideration of emission control technologies should be expanded to include the evaluation of technologies other than flaring or incineration. The commenter recommended that technologies which involve lower costs and energy requirements than flaring or incineration be evaluated for application to distillation facilities for which flaring or incineration has been determined to have too high a cost-effectiveness value. Specifically, the commenter pointed to product recovery devices, such as carbon adsorption, or other devices such as catalytic oxidation as technologies which should be examined further by the Agency for application to sources which are currently exempted from the emission reduction requirements.

RESPONSE: Several VOC control technologies such as recovery devices (including condensers) and catalytic oxidizers were also examined but were not included in the impacts analysis because the Agency was unable to identify subcategories for which those devices would always apply. The applicability and effectiveness of adsorption, absorption, or condenser devices for VOC emission control is sensitive to several physical characteristics of the organics in a vent stream and other stream characteristics. Organic characteristics such as solubility, molecular weight and liquid/vapor equilibrium are important to the success of using specific recovery devices for VOC control. Vent stream moisture content is also important. However, these characteristics are variable from vent stream to vent stream making it difficult to identify which particular recovery device would be appropriate for application to categories or subcategories of distillation vent streams.

In the case of catalytic oxidizers, these control devices are limited by: (1) their inability to combust all streams equally as efficiently, (2) the high capital cost of the catalyst, and (3) their inability to handle streams with high heating values. In addition, deactivation of the catalyst in these systems occurs at high temperatures. This is likely to occur during incineration of streams with high heating values, which is a common situation for distillation facilities. Catalysts can also be deactivated by compounds present in some waste streams, such as sulfur, bismuth, phosphorus, arsenic, antimony, mercury, lead, zinc, or tin.

Because of these susceptibilities to individual waste stream characteristics, using catalytic oxidation or recovery devices (including condensers) for VOC emissions reduction has not been demonstrated to be universally applicable to any identifiable subcategories of distillation process vent streams. The VOC reduction efficiencies may vary among processes and among plants. Although catalytic oxidizers and recovery devices were not included in the impacts analysis, these devices can be used to meet the requirements of these standards if they can achieve the 98 percent VOC reduction requirement on streams to which they are being applied.

Since the Agency is unable with available information and resources to identify subcategories of distillation operations for which other VOC control techniques have been demonstrated to always apply, there is no way to evaluate techniques for application to distillation units for which thermal incineration and flaring have been determined to be too costly. Even with greater resources, this approach would be infeasible because it would require a stream-by-stream characterization, ultimately resulting in the need for a separate standard for each vent stream from a process used to produce a distillation chemical. The number of standards required to regulate the same number of sources would increase by several hundred. The Agency believes that such an approach to regulating the SOCMI distillation industry would be administratively infeasible and therefore environmentally counterproductive. In any event, proceeding now with this generic regulation based on thermal incineration and flaring at least represents an important first step in regulating distillation emissions and does not preclude later regulation of subcategories of distillation facilities should that become feasible. The EPA believes it has the authority to take this step by step approach under Section 111. See, e.g., Group Against Smog and Pollution v. EPA, 665 F.2d 1284 (D.C Cir. 1981).

2.5 COST ESTIMATION

2.5.1 COMMENT: One commenter (D-15) suggested that the cost analyses presented in the preamble and BID that were used in developing the TRE index should be reevaluated. Several expenses were not included in the EPA cost equations. New cost equations should include:

(a) the cost of pipeline required to retrofit a distillation column in an existing plant to control vent stream emissions;
(b) the cost of locating combustion units in relatively remote areas to avoid a safety hazard;
(c) the cost of supplemental fuel required by flares for distillation vent streams with low net heating values; and
(d) the cost of monitoring equipment and recordkeeping.

RESPONSE: In response to this and other comments, the Agency reexamined the costing procedures used for the distillation operations NSPS. In addition to reexamining the costing procedures in light of these comments, many other cost assumptions not commented upon by industry were examined and, in some cases, changed to include more up-to-date information. When making revisions to the costs, the goal has been to provide an updated estimate of total annualized costs that are representative of the actual costs experienced by the majority of facilities in the industry. Industry comments, particularly those dealing with recommended equipment additions, were first carefully evaluated by EPA to determine if inclusion of such items were reasonable. If the addition of equipment was found to be valid, costs for that equipment were estimated and included. This approach was used for recommended operating cost revisions as well.

This commenter stated that new cost equations should include the cost of pipeline required to retrofit a distillation column in an existing plant. The EPA determined that since use of a new combustion device at a new plant should be the basis of costing, duct length criteria should be based on the most probable location of a new combustion device. Based on criteria established by the National Fire Protection Association (NFPA) and the Industrial Risk Insurers, EPA revised its design criteria to include 200 feet of ducting between the edge of the process unit and an incinerator and 300 feet of ducting between the edge of the process unit and a flare. An additional 100 feet of ducting was included in the costing to route the vent stream from the distillation unit vent to the edge of the process unit. Installation factors are included in the costing.

The costs of locating combustion units in relatively remote areas to avoid a safety hazard are implicit in the costing assumptions described above. A combustion unit is expected to be located as close as possible to the process unit, but far enough away to provide safety. For this reason, the Agency used insurance underwriter criteria for locating combustion sources at a safe distance from process equipment as a basis for costing.

The cost of supplemental fuel required by flares for distillation vent streams with low heating values was reevaluated by EPA in its operating cost revisions. For those distillation vent streams having heating values less than 300 Btu/scf (11.2 MJ/scm), gas enrichment is necessary to comply with the flare requirements of the proposed standards. It is likely that most vent streams would be enriched through the addition of natural gas. Therefore, the cost algorithm has been changed to incorporate the cost for adding enough natural gas to achieve a vent stream heating value of 300 Btu/scf (11.2 MJ/scm).

The cost of monitoring equipment and recordkeeping is not included in the cost analyses that were used in developing the TRE equations. However, these costs were estimated and determined to be reasonable to ensure proper operation and maintenance of either the recovery system or the control device. The TRE equations are used to determine BDT for each affected facility. All costs associated with reducing VOC emissions by 98 weight-percent or to 20 ppmv using either a flare or a thermal incinerator have been included in the TRE equations. These are the costs that are the basis of the BDT determination. Once this determination is made, the costs associated with monitoring the recovery system or control device to ensure proper operation and maintenance were estimated. The costs were then evaluated and used to determine which monitoring and recordkeeping requirements were necessary and reasonable. However, the TRE equations which are used to determine BDT for an affected facility do not include monitoring or recordkeeping costs.

2.5.2 COMMENT: Three commenters (D-11, D-27, and D-37) stated that the cost equation for flare systems result in costs that are too low. One commenter (D-27) reevaluated a specific case for flare costing, and felt that EPA has underestimated the total installed capital (investment) cost by a factor of 3 and the annual cost by a factor of 2. The reason for the low estimate of capital cost, according to commenters D-27 and D-37, is that EPA did not adequately include all the services and auxiliaries needed to make the system operate. The major capital cost items identified as being either overlooked or not adequately treated by EPA include the following: (a) 500 feet of new pipe bridge; (b) all steam, natural gas and electrical services to the flare; (c) knock-out drum and fluidic seal; and (d) a TV camera to observe flare operations for smoke and a TV monitor in the central control room. Major annual cost components identified as being either overlooked or not adequately treated by EPA include the following: (a) general plant overhead estimated as 50 percent of operating and maintenance labor costs; (b) engineering and environmental oversight costs estimated as about 40 percent of maintenance and operator labor costs; (c) labor and supervision for maintenance estimated as 3 percent of the total installed capital costs; and (d) operating supplies estimated as 15 percent of maintenance costs. Miscellaneous cost components that the commenter said were overlooked by EPA include the following: (a) a general contingency allowance; (b) a labor allowance for bad weather; (c) the cost of a strip chart recorder for temperature monitoring; and (d) electrical control room equipment.

The same commenter (D-27) indicated EPA has made two basic flare design errors that would result in additional material and operating expenses. One flare design error results in an unsafe continuous heat intensity at ground level. A much lower heat intensity should be used, resulting in a greater flare height, and therefore greater capital and annual costs. However, the commenter did not recommend an alternative value for ground level heat intensity. The other design error indicated by the commenter is that the flare tip pressure drop of 27 inches of water is too high for the 60 ft/sec exit velocity limitation in the proposed standards. The 27 inch pressure drop is also inconsistent with smokeless flare operation. The commenter suggested the pressure drop be specified at less than 1 inch of water, which would require a greater flare tip diameter and an increase in the estimated capital cost.

One commenter (D-11) stated that the EPA flare specifications would result in higher capital and operating costs than the costs estimated by EPA. The increased costs would be due to the larger diameter flares needed to meet the flare specifications of 60 ft/sec exit velocity and a 300 or 200 Btu/scf (depending on flare type) minimum heating value. Examples of these increased costs include: (a) an increase in pilot gas requirements; (b) shortening of flare tip life due to higher operating temperatures when exit velocities at or below 60 ft/sec are used; and (c) added purge gas requirements during shutdown and periods of no flow to the flare.

RESPONSE: In response to commenters' concerns regarding flare costing assumptions, the Agency has reevaluated all costing assumptions and revised them where it was justified. Throughout the development of the distillation NSPS the Agency has made efforts to ensure that the cost algorithm resulted in estimates that adequately represent control costs anticipated to be incurred by the majority of facilities in the industry. Prior to proposal, industry members were given the opportunity to provide substantial input into the development of the cost algorithm. Preliminary costing assumptions were reviewed by industry and subsequently revised based upon industry input.

After proposal, costing assumption revisions were prepared and presented in a supplemental Federal Register notice (50 FR 20446) on May 16, 1985. This notice solicited further comments on costing procedures. The bases for these revisions are documented in Docket Entry IV-B-8. The Agency feels confident that the revised cost procedures represent accurate estimates for typical facilities.

Revisions to the capital cost assumptions included the addition of the costs of a new pipe support system for use in routing flare services and the vent stream to the base of the flare. The 500-ft pipe bridge referred to by the commenter is apparently a heavy-duty support structure capable of supporting several large diameter pipes or ducts. Based on vent stream data, the Agency judged that the flare system would need a structure capable of supporting relatively small diameter pipes or ducts and the number of these pipes or ducts would be few. Therefore, the cost for a lighter weight pipe rack was included in the cost algorithm instead of a pipe bridge.

Flare services (steam, air, and natural gas) were not included in the original cost analysis for the proposed distillation standard because EPA originally thought that existing flare services would be available. Upon review of the requirements for flares dedicated to the control of distillation vent streams, EPA determined that it was appropriate to include the capital costs for flare services because many new flares would be built at locations remotely located from existing flare services. Estimated capital costs for flare services include pipe suspension and installation costs. The commenter included electrical services in the flare services item. Capital costs associated with electrical services are accounted for in the installation factors built into the costing procedures. These include a 0.01 electrical factor under installation, a 0.03 contingency factor under indirect costs and a 0.10 construction and field factor under indirect costs. These installation factors are meant to account for any variability of costs beyond the actual costs for the flare itself and are consistent with engineering cost estimation practices.

The knock-out drum and fluidic seal are included in the estimated cost for the flare system. Furthermore, EPA believes that these two devices have been adequately accounted for in the costing procedure developed at proposal.

The Agency has reviewed and, where appropriate, revised costing assumptions for annual cost components. The costing procedures used at proposal did include the calculation of operating labor, maintenance labor, and overhead, but the maintenance labor and overhead calculations were not separate, easily identified line items, making comparison of labor rates difficult. Since procedures used at proposal were not well defined, and because it is reasonable to assume supervisory labor will be needed in operating the flare system, EPA decided to include supervisory labor costs and to use an alternative method for calculating overhead costs. Supervisory labor cost is estimated to be 15 percent of the operating labor cost. Overhead labor cost is calculated as 80 percent of the sum of operating, supervisory, and maintenance labor costs. Maintenance labor cost is calculated as 3 percent of the total installed capital cost of a new flare system. Previously, the cost of maintenance labor and parts had been estimated together. Maintenance parts costs are now calculated as 3 percent of total installed capital cost.

Engineering and environmental oversight costs were cited by the commenter as being inadequately represented. However, EPA believes these costs are adequately accounted for in its revised costing procedure. As stated above, the Agency has considered supervisory labor in its revised costing procedures. In addition, the costs of maintenance labor and materials to ensure the proper operation and maintenance of control devices are included in the costing procedures. The Agency considers these costs to be representative of the costs associated with proper operation and maintenance of the control devices. Because any additional labor needs as a result of bad weather will be one time costs and are unpredictable, no allowance was made in developing the costs associated with normal operation.

The Agency has reviewed flare design criteria to ensure they represent the safe practices for workers in facilities complying with the standards. The maximum ground level thermal radiation intensity design criterion used at proposal (1,200 Btu/hr-ft^2 from the flare alone) was determined to be too high. A lower maximum ground level intensity (140 Btu/hr-ft^2 from the flare alone) has been selected. The EPA agrees that for vent streams having high heating values and high flow rates, the revised maximum thermal radiation intensity at ground level lead to a taller flare design. However, the cost for controlling most distillation vent streams would be unaffected by this change because they typically contribute much less than 140 Btu/hr-ft^2 at ground level even when combusted through the shortest flare commercially available (30 ft).

In the cost algorithm used at proposal, the pressure drop associated with the flare tip was at least 27 in. water column, depending on the vent stream characteristics. However, in reviewing the previously constructed cost algorithm and the associated flare design criteria, EPA has determined that a pressure drop of this magnitude is representative of a typical emergency flare operation, not a flare designed for low velocity, continuous vent stream such as for a distillation operation. A flare tip pressure drop that is more representative of a dedicated flare designed to handle a continuous flow vent stream was calculated to be slightly lower than 0.5 in. water column. The Agency does not believe that the flare tip design pressure drop would promote smoking in an operating flare.

The EPA's revision of the flare design criteria to reflect the velocity limitation included in the proposed standard resulted in an increased diameter for the flare tip, and, therefore, a slightly increased capital cost for some of the higher flow rate vent streams. For many distillation vent streams, the diameter calculated according to the revised design criteria will be less than 2 inches, the smallest available flare diameter. These streams would have required a 2-inch diameter flare according to the previously used design criteria as well. For those distillation vent streams, the cost of the flare would remain unchanged. However, for streams with flow rates sufficiently high to require larger flare diameters using the revised design criteria, the revision will cause a slight increase in capital cost.

Pilot gas and purge gas costs are included in annual direct operating and maintenance costs and have been calculated based on flare design parameters. The commenter cited costs resulting from the shortening of flare tip life due to higher operating temperatures. The Agency is aware that combustion control equipment is subject to maintenance, repair, and replacement. In the costing procedures, maintenance labor and maintenance parts are each included as 3 percent of the total installed capital cost of the combustion system. The costing procedures also include annualized equipment capital costs which are based on a 15-year life for flares.

The commenters suggested the inclusion of the cost of monitoring equipment in the cost analysis and TRE equations. The items suggested include a TV camera and monitor, a strip chart recorder for temperature monitoring, and electrical control room monitoring equipment. While the cost of the monitoring and recordkeeping requirements has been estimated and determined to be reasonable, this cost was not included in the development of the TRE equations. For further information, see response to Comment 2.5.1.

2.5.3 COMMENT: One commenter (D-9) stated that EPA did not include in its cost estimates of combustion control systems the cost associated with continuous recording of temperature measurements for incinerator fireboxes and for boilers or process heaters. The commenter indicated that continuous recording can be quite costly. A temperature range of 2,500 - 3,200°F is common to the fireboxes of incinerators and boilers. Typically, platinum/rhodium thermocouples are required to handle these temperatures, and such systems commonly cost approximately $15,000 per installation.

RESPONSE: The EPA believes that the cost of an adequate temperature/recording system would cost well below $15,000. In fact, vendor data show the equipment cost could be approximately $4,500 even if a platinum/rhodium thermocouple were needed (see Docket Entry IV-E-9). Furthermore, peak temperatures exceeding 2,800°F are expected to occur for boilers where temperature monitoring is required while the maximum temperature for an incinerator firebox is expected to be around 2,000°F. Therefore, less expensive materials than the commenter suggests could be used to monitor incinerator temperatures. The Administrator has determined that the costs associated with the monitoring requirements of the final standards are reasonable. However, these costs were not included in the development of the TRE equations (see response to Comment 2.5.1).

2.5.4 COMMENT: Two commenters (D-12 and D-27) disagreed with the assertion in the preamble that annualized costs associated with the disposal of sodium chloride from scrubbing incinerator flue gases are insignificant. Both commenters stated that disposal will be expensive unless the plant is located near salt water and can get a permit to dump its brine. One commenter (D-27) indicated that the operating costs for deep-well disposal of sodium chloride range from $3 to $6 per 1,000 gallons of brine.

RESPONSE: The Agency has conducted an investigation into the methods of brine disposal available to the chemical industry (see Docket Entry IV-B-11). This investigation included a review of available literature and discussions with State regulatory agencies, brine disposal companies, chemical manufacturers, and consultants. Alternatives available for brine disposal include:

- o Direct discharge.
- o Evaporation.
- o On-site deep well injection.
- o Off-site deep well injection.
- o Existing disposal method if the plant is already disposing of brine solutions.

Of the disposal methods shown above, off-site deep well injection is considered to be the most expensive and least popular. The option is generally viewed as impractical by industry representatives due to its costs. Based on available data, there appears to be no reason why any facility covered by the distillation NSPS would not be able to select one of the other lower cost options. It is assumed that all facilities will use the lowest cost option available. Therefore, the Agency has no reason to believe that any distillation facility will incur a significant brine disposal cost as a result of this NSPS.

2.5.5 COMMENT: One commenter (D-27) recommended that all costs discussed in the preamble be inflated from 1978 dollars to first quarter 1984 dollars. This commenter indicated that the cost-effectiveness cutoff would then become $2,600/Mg, which is significantly higher than $1,900/Mg.

RESPONSE: The EPA agrees that the cost effectiveness of $1,900/Mg (December 1978 dollars) would be about $2,600/Mg in first quarter 1984 dollars. However, EPA maintains that this would not change the analysis or the requirements of the standards. When the analysis for the distillation NSPS was begun, it was decided that 1978 would be the appropriate base year for costs because more recent data were not available. If the implicit price deflator for the gross national product is applied, the cost-effectiveness cutoff inflates 40 percent over the 5-year period. However, regardless of whether it is expressed in 1978 or 1984 dollars, the cost-effectiveness cutoff has the same impact. If the cost-effectiveness cutoff is increased by 40 percent by an inflation factor to $2,600/Mg, the reference cost effectiveness will also increase by 40 percent, since both values are calculated using the same cost assumptions. Furthermore, in considering an inflated TRE cutoff, it should also be realized that the value of the benefits associated with the standards are also inflated accordingly. Thus, the ratio will remain the same, and the TRE index cutoff value will still be 1.0. Inflation does not affect the validity of the TRE index. Thus, there is no need to revise the cost-effectiveness cutoff.

2.5.6 COMMENT: Two commenters (D-7 and D-25) noted that EPA did not adequately address the capital costs of precautionary safety measures necessary when introducing a vent stream into a boiler or process heater as a fuel. According to one commenter, the NFPA may require safety closure valves and vent systems, as well as appropriate containment when vent streams are combusted as fuel. These safety measures would increase the capital cost of using a boiler or process heater to combust vent streams. The other commenter indicated that to prevent explosions, liquid hydrocarbons must be kept out of the vent streams going to these units. The extra cost for surge tanks, knock-out drums and extra control instruments would cancel out most of the economic benefits associated with using the vent stream as a fuel.

RESPONSE: Boilers and process heaters can sometimes be attractive candidates for the control of vent streams from distillation facilities because they can provide at least 98 percent reduction efficiency of VOC and nearly the complete recovery of the heat content of a vent stream. There are three plants in the available data that use boilers as a control device on vent streams with heating values ranging from 449 to 1,258 Btu/scf. Because these streams have high energy recovery potential, there is an economic incentive to use boilers in order to recover heat energy.

The EPA did not include boilers or process heaters as control devices in the regulatory analysis and as such, specific boiler costs such as the ones outlined by the commenter do not play a role in analyzing cost impacts associated with the standards. Since flares and incinerators are more widely applicable for VOC control than are boilers or process heaters, EPA selected flares and incinerators as the control techniques upon which the standards are based and estimated the impacts associated with their application. Because the impacts associated with the use of flares and thermal incinerators were found to be reasonable for all distillation operations that would be required to reduce VOC emissions by 98 weight-percent or to 20 ppmv according to the standards, there was no need to evaluate the impacts associated with other less expensive control techniques.

2.5.7 COMMENT: One commenter (D-25) stated EPA did not include the cost of more expensive compressor and pipeline systems in its cost estimates for combustion control. It was noted that for each of the combustion control options considered, EPA assumes in its cost equations that the same type of pipeline system is used to recover vent gases and deliver them to the combustion device. This approach may be both impractical and unsafe for some vent streams containing potentially explosive compounds, or compounds which present erosion problems during liquefaction. Such compounds (e.g., chlorotrifluoroethylene) are not necessarily included in the list of products to be regulated, but may be included in the emission streams containing compounds that are listed.

RESPONSE: The commenter noted that the vent stream mover system included in the costing procedures at proposal would present erosion problems due to liquefaction. The EPA believes that the relatively low pressure drops expected for flare and incinerator mover systems [i.e., 3.0 kPa (12 in. w.c.)

for an incinerator and 5.2 kPa (21 in. w.c.) for a flare] would not cause significant liquefaction problems with pipeline components. Thus, erosion problems would be minimal. However, EPA is aware that minor problems with erosion, corrosion, and the like over an extended period of time may cause maintenance expenses. To account for these costs, the costing procedures for flares and incinerators include maintenance labor at 3 percent and maintenance parts at 3 percent of the total installed capital cost of the combustion system. In addition, since the combustion systems will eventually have to be replaced, annualized capital costs are calculated based on reasonable expected system lifetimes. The costing procedures use a a 10-year life for incinerators and a 15-year life for flares. It should be noted that incinerators are used for combusting more corrosive (i.e., halogenated) streams.

The design of flare systems include various safeguards against explosion. These include knockout drums, water seals, fluidic seals, and purge gas systems. Major equipment purchase costs for incinerators include equipment for fire protection. Furthermore, the capital costing for combustion systems includes a contingency factor to address site-specific needs for special combustion system design. The unique requirements of individual distillation units are expected to be addressed by the contingency factor allowance.

2.5.8 COMMENT: One commenter (D-32) stated that the BID description of price increases that might follow from the NSPS is deceptive because EPA assumed that control costs will automatically pass through to consumers. The competitive environment of the chemical industry, the commenter continued, makes pass-through opportunities rare. As evidence, the commenter cited the experience of producers who are unable to pass Superfund costs through to consumers. Therefore, the commenter concluded, EPA should emphasize the separation of costs and prices, and should modify the analysis of rolled-through costs, particularly the statement on p. 8-39 of the BID that reads "producers of intermediates will roll through the entire cost of control to other SOCMI producers."

RESPONSE: Standards may affect prices, profits, production levels, capacity utilization, construction of new facilities, employment, foreign trade, and a myriad of other economic variables. Confronted with so many variables, and with standards that will affect the production of 211 chemicals, EPA focuses its analysis on projecting worst-case, or reasonably worst-case price effects. This focus simplifies the economic analysis and yet enables EPA to be sure a standard will not have any significant, unexpected, harmful economic effects. However, a worst-case analysis does not lead to predictions about most probable effects. In the case in point, an effort was made to find the upper limit of price increases that could result from this distillation NSPS. Finding the upper limit is quite small, less than 5 percent, EPA went on to analyze other variables. No effort was made to predict most likely short- or long-term price effects.

The EPA did not intend to convey the impression that all control costs are rolled along a chemical process chain and then passed along to consumers. Some are, but, especially in the short run, some are shared by stockholders, taxpayers, and suppliers. The commenter's finding that some firms cannot pass through Superfund costs is not applicable to an NSPS. Superfund taxes are assessed to existing operations. The NSPS costs apply only to future, new facilities, and to some existing facilities after they are modified or reconstructed. It is not in the economic interest of a firm to build, to modify, or to reconstruct facilities until and unless a reasonable return can be expected on the investment, including the investment in pollution control. Thus, in the very long run, when all facilities come under the standard, all control costs probably will be passed through. However, it should be remembered that the modeling assumptions EPA used to compute price increases are very conservative. This means that the actual long-term price increases should be less than EPA's very conservative estimates.

The quotation given by the commenter is incomplete. The full sentence from p. 8-39 of the BID is "The analysis here assumes that all facilities -- existing as well as the new -- are subject to the standards, and that producers of intermediates will roll through the entire costs of control to other SOCMI producers." These are two conservative assumptions in the sense that they lead to an overestimation of price increases. Clearly, the distillation NSPS does not apply to the majority of existing facilities. It is also clear that all producers will not roll through all costs in the first 5 years of the standard. (Five years is the period of analysis used in most studies of this nature.) To replace these and other conservative assumptions with most-probable assumptions would require a substantial commitment of EPA's time and resources. Furthermore, prediction of expected, most-probable price changes would not influence the final form of the standard.

For these reasons, EPA does not think it is necessary to revise the price increase analysis.

2.5.9 COMMENT: One commenter (D-15) stated that EPA should consider the cost of fuel oil in estimating the cost of controlling vent streams with extremely low heating values. It was indicated that some distillation facilities may choose to use fuel oil instead of natural gas to supplement the low heating value of vent streams if flaring were used as a control device. Fuel oil may be used in some cases because it is relied upon more than natural gas at some facilities where both fuels are available. The commenter believes that using fuel oil instead of natural gas could increase the cost of controlling VOC emissions.

RESPONSE: The Agency chose to include the most typical equipment and operating procedures in estimating the cost of controlling VOC emissions. The use of fuel oil as a supplemental fuel for flaring was not considered because the Agency believes that the vast majority of producers have access to natural gas and the vast majority of producers would use natural gas as a supplementary fuel for flaring. The costs were developed to be representative of the costs anticipated to occur at the majority of facilities in the industry.

The commenter was contacted for clarification of the statement regarding the need to consider the cost of fuel oil. The commenter indicated that natural gas is not always available and fuel oil is required for flaring for about 10 percent of the operating schedule (Docket Item No. IV-D-38).

However, because there is a diverse group of chemical producers it would be infeasible to evaluate every process and producer on an individual basis. Therefore, the Agency must use a method of estimating control costs that are typical of the vast majority of SOCMI producers. The EPA believes that it is reasonable to incorporate into the flare costing algorithm the cost of natural gas as the only supplemental fuel for flaring.

2.6 COST EFFECTIVENESS

2.6.1 COMMENT: Five commenters (D-11, D-20, D-23, D-24, and D-27) are in favor of using the TRE approach in the proposed standards. Reasons given include: (a) it gives a standardized cost estimate that can serve as a rational basis for developing standards; (b) it encourages product recovery and considers economic viability; and (c) it shows a consideration of the large incremental costs associated with diminishing air quality benefits in the standards development process. One commenter (D-2) is in disagreement with the use of cost effectiveness as the sole determinant for which facilities have to use add-on control devices.

Two commenters (D-21 and D-27) indicated that the $1,900/Mg cost-effectiveness cutoff is unreasonable. One commenter (D-21) suggested that cost-effectiveness ratios are not a valid basis for not requiring the use of controls that EPA's analysis shows are affordable. This commenter then suggested that, even if cost effectiveness were relevant, EPA chose the wrong cutoff because: (1) it is below the cost-effectiveness level associated with a substantial number of past standards; and (2) even if the cutoff were above those past figures, the higher costs are justifiable as means to protect the public health from the potentially hazardous pollutants in these streams.

One commenter (D-27) considers the TRE cutoff as too high and stated that the $1,900/Mg cutoff is not adequately justified by the Agency. The commenter suggested that a $500/Mg cutoff is more than adequate to secure all meaningful reductions. A plot of the data from Table 1 at 48 FR 57545 shows a point of sharply diminished VOC emission reduction in the $200 to $600/Mg range with essentially no additional reduction in emissions achieved at any cost above that range.

Commenter D-27 stated because EPA has underestimated the total installed capital cost of control devices by a factor of 3 and the annual operating costs by a factor of 2, the cutoff of $1,900/Mg (1978 dollars) for VOC abatement is understated. The actual cutoff figure, as calculated by the commenter in first quarter 1984 dollars, it about $5,400/Mg. The commenter indicated that this exceeds the $1,000/Mg limit used in most other NSPS.

Two commenters (D-27 and D-37) asserted that the $1,900/Mg cutoff cannot be justified based on the presence of toxic constituents in the vent streams from distillation facilities. One of the commenters pointed out that control of toxic pollutants is the objective of standards developed under Section 112 of the CAA (NESHAP) and not standards such as these which are being proposed pursuant to Section 111 of the Act (NSPS). The commenter also stated the preamble does not adequately demonstrate that the presence of toxic pollutants in the emissions from distillation facilities are sufficiently different from the emissions from other VOC sources to justify a special consideration of their hazards. Concerning VOC emissions generally, the commenter stated that EPA has decided (48 FR 628) an ambient air standard to protect public health, etc., from hydrocarbons is unnecessary.

RESPONSE: The EPA believes that its decision to consider cost effectiveness when determining the cutoff for applying the percent reduction standards reflects a reasonable interpretation of Section 111 of the CAA. In analyzing the question of whether the consideration of cost effectiveness is appropriate, EPA looked to see whether Congress had "directly spoken to the precise question." Chevron, U.S.A., Inc. v NRDC, 467 U.S. 837, 104 S.Ct. 2778, 2782 (1984). Section 111 requires EPA to promulgate NSPS limiting emissions to the level that reflects the best system of emission reduction "which (taking into consideration the cost of achieving such emission reduction, any nonair quality health and environmental impact and energy requirements) the Administrator determines has been adequately demonstrated." Section 111(a)(1). Nothing in either Section 111 or elsewhere in the Act defines "the cost of achieving such emission reduction." The plain meaning of the phrase, however, is quite broad. This indicates that Congress implicitly delegated to EPA the authority to interpret the phrase to encompass a range of impacts, including costs of control in relation to the emission reduction achieved. Further, Congress did not specify any particular manner in which EPA was to take these costs "into consideration." Thus, absent a clear Congressional direction to the contrary discernible from the Act's history, Chevron, 104 S.Ct. at 2783, Section 111 gives EPA authority to reject NSPS control options on the ground that their costs are unreasonably high in light of the emission reductions they achieve. 1/

The EPA has reviewed the legislative history of Section 111 and concluded that no contrary intent is discernible. Most important, the history contains no express repudiation of the use of cost effectiveness as one mechanism in considering costs when setting an NSPS.

For these reasons, EPA believes that Congress implicitly delegated the Agency the authority to decide how best to "take into consideration... cost" in setting NSPS and, if the Agency concluded it was appropriate, to consider cost effectiveness.

Further, in Portland Cement Association v. Train, 513 F.2d 506, 508 (D.C. Cir. 1975), cert. denied, 416 U. S. 1025 (1975) ("Portland II"), the Court stated that EPA may reject control options that result in a "gross disproportion between achievable reduction in emissions and cost of the control technique." Since the purpose of cost-effectiveness analysis is to highlight such disproportion, this passage supports EPA's approach.

In selecting cutoffs related to applicability of NSPS, EPA looks at a variety of factors including: (1) the technical feasibility of additional control; (2) the economic feasibility associated with different control alternatives; (3) the magnitude of emission reductions associated with a control alternative (e.g., a slightly higher cutoff could be selected if it led to a substantial increase in the emission reduction achieved by the NSPS);

1/ For instance, Congress provided a more specific restriction on the consideration of costs on Part C of the Act. Section 169(3) defines "best available control technology" as "an emissions limitation based upon the maximum degree of reduction... taking into account energy, environmental, and economic impacts and other costs, determines is achievable for such facility..." (Emphasis added). Here it is more likely that Congress intended to ensure the maximum control considering case-by-case economic impacts but regardless of cost effectiveness.

(4) the cost effectiveness (C/E) of the control alternative in terms of annual cost per megagram ($/Mg) of emissions reduced; (5) the quality of the cost estimates (e.g., worst case versus realistic estimates); (6) potential reductions in other air pollutants not specifically regulated by the NSPS resulting from a control alternative; and (7) the location of the sources (e.g., urban versus rural). Because these factors vary from industry to industry and, in some cases, within the same industry, decisions on the appropriate level of control are made on a category by category basis.

In evaluating the above factors, EPA found that the following considerations were key to the selection of the appropriate cutoff for SOCMI distillation operations: (1) the cost effectiveness of NSPS for VOC emissions previously promulgated by the EPA; (2) the fact that distillation vent streams contain compounds that are considered potentially toxic by EPA and that many of the facilities are located in urban areas; and (3) the likelihood that these maximum costs will not be incurred by industry.

A survey of the VOC standards for other source categories shows that the cost effectiveness of those control requirements has sometimes ranged as high as $2,000/Mg. (See Docket Item No. IV-B-17.) The Agency's experience in implementing these standards reveals that NSPS requiring this level of control have proved a useful tool in bringing about the installation of much emissions control technology, significant reductions in emissions and corresponding improvements in air quality, yet have not imposed costs that appear "grossly disproportionate" to the emission reduction achieved. Portland II, 513 F.2d at 508. Such an approach simply makes this NSPS consistent (as to dollars spent per metric ton of VOC removed) with the existing body of NSPS regulations, all of which have either been promulgated without legal challenge or have been judicially upheld.

EPA also considered evidence that distillation streams include compounds that may be toxic. 2/ Although that evidence has not yet resulted in a

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2/ The Agency has adequately documented that this is the case. (See Wehrum, W. et al., "Air Toxics Emission Patterns and Trends", Docket Item No. IV-A3, and Registry of Toxic Effects of Chemical Substances, Docket Item No. IV-J-9). Moreover, it is apparent that combustion of those streams will reduce those compounds proportionately. (See, e.g., "Thermal Incinerator Performance for NSPS", Docket Item No. II-B-3.) The Agency received no comment questioning this documentation.

determination that those compounds should be listed as hazardous under Section 112, EPA considered this potential toxicity along with other relevant factors when choosing the cutoff. As stated in EPA's Air Toxic Strategy published in July 1985, the Agency will consider the likely toxic pollutant control benefits in the course of carrying out its responsibilities under Section 111. This strategy reduces emissions of potentially toxic compounds from new sources and from industries as their facilities are reconstructed or modified. This approach achieves significant reductions in these compounds of concern while the Agency evaluates them for regulation under Section 112. The Agency disagrees with the argument that EPA has no authority to do this. The EPA is not attempting here to regulate streams based on a decision that they contain hazardous air pollutants within the meaning of Section 112. Rather, the Agency is simply considering all available evidence within the framework of Section 111. Section 111 does not attempt to restrict EPA's discretion to consider all relevant factors in making that decision, and certainly the potential toxicity of a stream is relevant to the control requirement selected. Many SOCMI facilities are located in urban areas and, as a result, many people will be exposed to any hazardous air pollutants emitted from these facilities.

A third consideration in setting the cutoff at $1,900/Mg is the likelihood that no facility will actually have to incur the costs implied by that cutoff. The reasons are: (a) less expensive control systems may be used, thus reducing the costs and cost effectiveness incurred by individual facilities; (b) the cost estimates for thermal incinerators and natural gas prices are overstated; and (c) the inherent flexibility within the regulation encourages the use of product recovery modifications that will significantly reduce the cost incurred by individual facilities that may have otherwise had to add a combustion device. The regulatory analysis assumes that each distillation operation process vent would have its own combustion device and would need separate ducting and support structures. It is expected, however, that some operations will share control systems with other process vents. The analysis also assumes that incinerators or flares will be used to reduce VOC emissions by 98 weight-percent. However, many facilities will opt to use boilers, process heaters or catalytic oxidizers. When these devices are used, the cost of control will be significantly reduced over the cost of thermal incineration. Data on current capital costs of thermal incinerators indicate incinerators indicate that units are now available at substantially reduced costs compared to the costs used in developing these standards. Lower capital costs would reduce the annualized costs estimates, also, but not as significantly. This is an important consideration in selecting the appropriate cost-effectiveness cutoff. Another consideration is the fact that natural gas prices used to calculate the cost effectiveness for each stream are overstated by about 40 percent, even though they were updated after proposal (see following section on "Costing Revisions"). These conservative assumptions have resulted in higher cost and cost-effectiveness estimates than will actually occur. Finally, the standard encourages pollution prevention by not requiring 98 weight-percent reduction if a TRE index greater than 1.0 is maintained. The EPA believes that many facilities having a TRE index just below the 1.0 cutoff (equivalent to $1,900/Mg) will upgrade product recovery to reduce VOC and raise their TRE index above 1.0. This will significantly reduce the cost of control incurred by the industry while reducing emissions and will also minimize the national energy impacts. A preliminary examination of the national statistical profile shows that because many facilities have the potential to reduce VOC emissions sufficiently to raise their TRE values above 1.0, the highest cost effectiveness that a facility will actually incur as a result of installing a combustion device is estimated to be approximately $1,400/Mg.

The EPA believes that this process reflects a reasoned interpretation of the phrase "taking into consideration the cost of achieving such emission reduction," especially given the lack of clear Congressional guidance. The commenters' arguments that EPA should have selected either a higher cutoff to provide for a greater degree of protection of the public health, or a lower cutoff because most VOC standards have lower costs in relation to the resulting emission reduction, fail to provide a more reasoned methodology for selecting the appropriate level. Instead, they merely reflect each of the competing goals reflected in Section 111's history, as described above.

Consideration of all of the above factors confirmed EPA's belief that a TRE value of 1.0 (i.e., $1,900/Mg) represents an appropriate cutoff for determining which facilities must reduce VOC emissions by 98 weight-percent or to 20 ppmv. The cutoff is specific to the SOCMI distillation operations source category and would not necessarily be appropriate for other source categories; therefore, it should not be viewed as a benchmark for other standards. It is not surprising, however, that the cost-effectiveness cutoff for distillation would be the same as for the air oxidation NSPS for a number of reasons. First, the same pollutant, (i.e., VOC) is being regulated. Second, the same general class of VOC emitters (i.e., SOCMI) and similar types of process equipment (e.g., recovery equipment) are affected. Third, the same types of control techniques are applicable.

A commenter was concerned that because EPA has underestimated the total installed capital cost and the annual operating costs of control devices, the TRE cutoff is underestimated. As a result of this and other comments, the Agency performed a complete review of all costing procedures. Based on that analysis, several changes to the costing methodology were made and presented in a supplemental Federal Register notice (50 FR 20446) on May 16, 1985. Changes made to costing procedures were based on information presented in two memoranda entitled "Revisions to the Incinerator Costing Algorithm" (Docket

Entry IV-B-7), and "Revisions to the Flare Costing Algorithm" (Docket Entry IV-B-8). The commenter is referred to Section 2.5.2 for a discussion of the costing methodology.

2.6.2 COMMENT: Two commenters (D-21 and D-27) indicated that EPA had used the same $1,900/Mg cutoff in the recently proposed air oxidation NSPS. They suggested this figure results from an EPA policy decision not from a specific evaluation of the costs and impacts associated with the distillation NSPS.

RESPONSE: The Agency has based the $1,900/Mg cutoff on a specific evaluation of the costs and impacts associated with the distillation NSPS. It is not surprising however that the cost-effectiveness cutoff for distillation would be the same as for the air oxidation NSPS for a number of reasons. First, the same pollutant (i.e., VOC) is being regulated. Second, the same general class of VOC emitters (i.e, SOCMI) and similar types of process equipment (e.g., product recovery) are affected. Third, the same types of control techniques are applicable.

2.6.3 COMMENT: One commenter (D-24) requested information on how the TRE equation was derived. The commenter stated that the derivation of the TRE equation coefficients is not explained in an understandable manner.

The commenter also requested clarification on when the TRE index value would need to be recalculated. The commenter presented two suggestions regarding when the TRE index value should be recalculated. Section 60.664(d) of the regulation states: "Each owner or operator of an affected facility shall recalculate the TRE index value for that affected facility whenever changes are made in production capacity, feedstock type, or catalyst type, or whenever there is replacement, removal, or addition of product recovery equipment." One of the suggestions made by the commenter is that recalculations of TRE index values should be done as part of the permit process only in situations where increases in emissions or changes in chemical constituents are likely to occur. The other recommendation presented by the commenter is that an exemption from monitoring or recordkeeping requirements should be allowed, perhaps if the TRE exceeds 10.0.

RESPONSE: A description of the development of the TRE index equations is presented in Appendix B of this document. An explanation of the derivation of the TRE equation coefficients is presented in Docket Item No. IV-B-15.

Since proposal of the standards, the Agency has revised the TRE equation and derived new coefficients for the equation. These revisions resulted from changes in the costing procedures. The results of the Agency's reanalysis of the TRE equations, coefficients, and costing procedures are discussed in the supplemental notice reopening the public comment period (50 FR 20446).

The EPA requires that the TRE be recalculated for the changes listed in Section 60.664(d) because the changes have the potential to lower the TRE index below 1.0 indicating the cost of control for that facility is below $1,900/Mg of VOC removed. In some cases it may be possible to make process changes that would require the recalculation of a TRE index but would not come under the permit review process. Therefore, it would be improper to use the permit review process as a trigger for initiating this determination as suggested by the commenter. In some cases it may be possible to make changes in the process which could result in a TRE index less than 1.0, but which would not come under the permit review process. Therefore, EPA believes that it is necessary to require a TRE calculation as a result of the changes listed in the regulation in order to ensure that the standards are being met by all facilities.

The commenter suggested that EPA exempt affected facilities showing a TRE index value greater than 10.0 from monitoring or recordkeeping requirements. Several changes were made in the regulation to provide for inclusion of a maximum TRE index value above which monitoring and recordkeeping requirements would not be imposed on a facility attempting to comply with the standards. It is the judgment of the Agency that facilities with TRE index values above 8.0 would most likely not be able to make process changes that would cause the TRE index value to fall below the cutoff. Thus, the Agency believes that the monitoring and recordkeeping burden should not be imposed on such facilities. However, if a process change occurs, the facility would have to recalculate the TRE index value as required in Section 60.665(f)(1) to determine whether the value remains above the TRE maximum. Sections 60.664 and 60.665 of the regulation have been amended to incorporate the requirements associated with the maximum TRE index value. The basis for the determination of the 8.0 TRE index value is discussed in Docket Item No. IV-B-14.

2.6.4 COMMENT: One commenter (D-27) requested clarification on determining removal efficiency for a recovery device when vents that are affected and vents that are unaffected by the proposed standards are routed through the same recovery device. The commenter presented an example where the vent streams from an affected distillation column and a distillation column not covered by the standards are combined and fed to a single condenser. The commenter stated that for this example two different TRE values could be calculated depending on the assumption used in estimating the removal efficiency of the condenser. One TRE value is based on the condenser removal efficiency for all of the VOC removed from both vent streams (Case 1). The other value is based only on the removal efficiency associated with VOC present in the vent stream affected by the proposed standards (Case 2). For Case 1, the TRE value calculated with the condenser removal efficiency based on the combined stream was found to be below the $1,900/Mg cutoff. For Case 2, however, the TRE value calculated with the condenser removal efficiency based on only the affected vent was found to be above $1,900/Mg. The commenter is unsure of the correct procedure for estimating removal efficiency but suggested that the efficiency be based on only the affected vent.

The commenter indicated the designation of affected facility that includes all distillation units vented to a common recovery device as one affected facility would eliminate the confusion over which removal efficiency to use for the TRE calculation.

RESPONSE: With the change in designation of affected facility (see comment 2.2.1) there will be no need to use the removal efficiency for a product recovery device in calculating the TRE when an affected distillation vent stream is combined with existing distillation vent streams. As a result of the change in designation, all of the distillation units vented into a common product recovery device will be the affected facility. To calculate a TRE index value the vent stream characteristics of the total flow exiting the final recovery device will be used and no apportioning of removal efficiency to the affected vent stream will be necessary.

2.6.5 COMMENT: One commenter (D-30) believes that the TRE index calculation contains no provision for the high efficiency of product recovery devices used in large distillation facilities. It was pointed out that generally, larger facilities operate more efficiently than smaller facilities in the production of synthetic organic chemicals and subsequent recovery of organics from process vent streams. The commenter stated that even though a large facility is more efficient than a small one, the TRE index calculation would allow a small facility to be exempt from coverage by the standards, while a larger facility would not be exempt only because of its larger vent stream flow rate and higher VOC emission rate. Therefore, the commenter suggested that a factor be included into the TRE index calculation that relates total facility production rate to the final vent VOC emission rate.

RESPONSE: The TRE equation was developed to determine if the cost effectiveness of reducing VOC emissions is reasonable for a particular facility regardless of size. No facility will have to spend more than $1,900/Mg to meet the emission reduction requirements. The TRE equation estimates the total cost of constructing, operating and maintaining combustion equipment sized according to the flow rate and heating value of the vent stream from the facility. In general, vent streams from facilities using highly efficient product recovery would have relatively low VOC concentrations. These types of streams are expensive to control because substantial amounts of supplemental fuel must be added prior to combustion. This fact is taken into account in the TRE calculation. Conversely, vent streams emanating from less efficient product recovery devices usually have higher VOC concentrations. In these cases, combustion control is more cost effective and likely could be accomplished for less than $1,900/Mg. Therefore, it is not the size of the facility or the vent stream that predominantly determines which streams are required to be combusted but rather the vent stream VOC concentration (and associated heating value).

2.7 FORMAT OF THE STANDARDS

2.7.1 COMMENT: Eight commenters (D-5, D-11, D-12, D-13, D-17, D-20, D-22, and D-27) disagreed with the regulation of VOC emissions by controlling TOC emissions less methane and ethane. These commenters stated that the standards should not list methane and ethane as the only chemicals to be subtracted from TOC emissions. Instead, they suggested that the standards should allow for all compounds listed in 48 FR 57542 to be subtracted, if present in the vent stream, from TOC emissions. They stated that the compounds listed in 48 FR 57542 have been determined by the Administrator to be negligibly photochemically reactive.

One commenter (D-5) stated that it is not proper to subject distillation facilities that emit negligibly photochemically reactive compounds to standards specifically designed to limit the emissions of VOC which are photochemically reactive compounds and which contribute to ozone formation.

One commenter (D-27) stated that TOC's (minus methane and ethane) are not the best demonstrated surrogate to regulate VOC. The commenter indicated that Reference Method 18 gives specific compound identification and measurement capabilities. Thus, the compounds listed in 48 FR 57542 can be accurately measured and subtracted from TOC emissions. Therefore, the commenter requested that EPA regulate VOC emissions directly and allow the subtraction of negligibly photochemically reactive compounds from TOC emissions. In order for VOC emissions to be directly regulated the commenters suggested that the phrase: "less those compounds that are not VOC as determined by the Administrator" be used whenever the phrase: "less methane and ethane" is used in the standards.

RESPONSE: The NSPS for SOCMI distillation operations are intended to cover distillation facilities that emit VOC (i.e., compounds which participate in atmospheric photochemical reactions to produce ozone). Since compounds with negligible photochemical reactivity do not appreciably contribute to the production of ozone, the Agency believes that it is appropriate to exclude these compounds in determining a TRE index. The owner or operator of an affected facility should subtract the negligibly photochemically reactive organic compounds from the TOC, when quantifying the hourly emissions rate for input into the TRE equation. For example, if the vent stream of a facility contains 90 percent negligibly reactive organic compounds and 10 percent reactive organic compounds only 10 percent of the organic compounds emitted from that facility would be considered for calculating a TRE index. Although subtraction of negligibly reactive organic compounds is permitted, it is expected that no significant change in national impacts will occur since less than 5 percent of the distillation vent streams represented in the available emissions data contain these compounds.

However, subtraction of negligibly reactive compounds applies to hourly emission rate only and when determining the vent stream flow rate and heating value of a stream, these compounds must not be ignored. The TRE value incorporates the cost of supplemental fuel and if any of these compounds have a heating value associated with them they must be included to avoid overestimating supplemental fuel costs. The TRE value also incorporates the vent stream flow rate because the size of the total flow rate entering the combustion device influences the cost of control. The larger the total flow rate the greater it will cost to construct, operate and maintain a combustion device. Therefore, to properly evaluate the cost effectiveness for controlling a particular vent stream, the total flow rate and total net heating value are needed for the TRE calculation.

To allow for subtraction of compounds with negligible photochemical reactivity in calculating a TRE index, the definition of TOC in Section 60.661 has been modified. The new definition indicates that "Total Organic Compound" means those compounds measured according to the procedures in Section 60.664. For the purpose of determining the molar composition as required in Section 60.664(c)(1)(i) and the hourly TOC emissions rate as required in

Section 60.664(c)(5), Section 60.664(c)(7), and Section 60.665(g)(4), the definition of TOC excludes or allows the subtraction of those compounds which the Administrator has determined do not participate in photochemical reactions to produce ozone. The compounds to be subtracted are identified in EPA statements on ozone abatement policy for SIP revisions (42 FR 35314; 44 FR 32042; 45 FR 32424; 45 FR 48941)." These compounds are methane; ethane; 1,1,1-trichloroethane; methylene chloride; trichlorofluoromethane; dichlorodifluoromethane; chlorodifluoromethane; trifluoromethane; trichlorotrifluoroethane; dichlorotetrafluoroethane; and chloropentafluoroethane. An appendix to this document contains the complete copies of these notices.

Combustion devices destroy TOC by at least as great an efficiency as when only VOC are in the stream. Furthermore, it is less costly and less complex not to subtract the negligibly reactive compounds during performance testing. Therefore, these compounds should be included in determining the removal efficiency of thermal incinerators (performance tests).

2.7.2 COMMENT: Two commenters (D-8 and D-29) stated that EPA has given no method in the proposed standards for determining that the organic compounds listed in the preamble are not photochemically reactive organics. The commenters suggested that the owner or operator of an affected facility should be allowed to demonstrate that the particular organic compounds(s) involved in a given operation are not photochemically reactive organics. One commenter (D-8) further suggested that this demonstration could be submitted with the notification of initial startup required by Section 60.7(a)(3).

RESPONSE: There are no EPA-approved procedures on determining the photochemical reactivity of organic compounds. The EPA established the current list of negligibly photochemically reactive compounds through a broad research effort. During this effort, EPA has not developed a standard procedure by which anyone outside the Agency could demonstrate an organic compound to be of negligible photochemical reactivity.

As indicated in the response to comment 2.7.1, the Agency has agreed to allow for the subtraction of negligibly photochemically reactive compounds from the hourly emissions rate of TOC in determining a TRE index. The only negligibly reactive compounds that will be allowed to be subtracted are identified in EPA statements on ozone abatement policy for SIP revisions (42 FR 35314, 44 FR 32042; 45 FR 32424; 45 FR 48941) along with the rationale for determining that they are negligibly reactive. These citations are also given in the definition of "TOC" in the regulation, and copies of the complete notices are given in Appendix A to this document.

2.7.3 COMMENT: In Section 60.662(a) the regulation specifies that the 98 weight-percent reduction requirement and the 20 ppmv concentration limit must be met on a dry basis. One commenter (D-12) suggested that the low flow exemption of 0.008 m^3/min should also be on a dry basis.

RESPONSE: The EPA will continue to require the flow rate measurement for the low flow exemption to be based upon all of the vent stream components, including water vapor. Because the flow rate used in the TRE equation includes the concentration of water vapor and because the low flow exemption was developed from flow rate data measured on a "wet basis," it is appropriate for the low flow exemption to be consistent with the TRE equation and data.

2.8 MODIFICATION/RECONSTRUCTION

2.8.1 COMMENT: Four commenters (D-8, D-11, D-15, and D-22) recommended a wording change in Section 60.660(b) to indicate that affected facilities beginning modification or reconstruction after the date of proposal would be covered by the standards. This addition was recommended because of a discrepancy between the preamble and the regulation. The preamble (48 FR 57549) states: "The proposed standards would apply to all affected facilities, which commenced construction, reconstruction, or modification after the date of proposal of the NSPS." However, Section 60.660(b) of the regulation now refers only to affected facilities commencing construction after the proposal date. Another commenter (D-12) did not suggest any wording change, but requested clarification on the initial startup date for cases when existing facilities become subject to the NSPS.

RESPONSE: As stated in the General Provisions (40 CFR 60.1), standards of performance for new stationary sources apply to new, modified, and reconstructed facilities. This statement was reiterated in the preamble to the proposed standards. To avoid misinterpretation, EPA has clarified the wording in Section 60.660(b) of the regulation.

2.8.2 COMMENT: One commenter (D-19) inquired whether a change in the production of one chemical listed in the proposed standards to another listed chemical would result in a modification if emissions do not increase.

The same commenter requested that Section 60.660 of the regulation include a statement exempting process improvements from the standards. The requested statement is as follows: the addition or replacement of equipment for the purpose of process improvement that is accomplished without a capital expenditure shall not by itself be considered a modification under this subpart.

RESPONSE: Section 60.14 of the General Provisions of 40 CFR Part 60 defines "modification" for purposes of NSPS generally. If a change in the production of one listed chemical to another listed chemical were done with a resulting increase in emissions then that change could be considered a modification. However, if the distillation operation were designed prior to the applicability date of the standards to accommodate the production of this different listed product then the change would not be a modification regardless of changes in emissions.

The commenter requested that process improvements that are accomplished without a capital expenditure not be considered as modifications. An exemption similar to what the commenter requested was included in the standards of performance for equipment leaks in the SOCMI (48 FR 48328). However, as discussed in the preamble when those standards were proposed (46 FR 1139), the reason for the exemption was that routine changes and additions of fugitive emission sources in an existing SOCMI process unit could result in the unit's being modified and, therefore, subject to the standards of performance. In this situation, the addition of a small fugitive emission source to the process unit would result in all of the fugitive emission sources within the entire process unit being covered by the standards. However, under the standards of performance for SOCMI distillation operations, if a change or addition is made for process improvement reasons to an existing distillation facility that results in an increase in VOC emissions, only that facility is considered modified and subject to the standards. The impacts associated with covering this type of situation have been analyzed and determined by the Administrator to be reasonable. Therefore, process improvements will not be exempted from the standards.

2.8.3 COMMENT: One commenter (D-24) stated that it may not be technically or economically feasible to meet the standards for a few modifications of existing facilities. In these circumstances, adequate space or land may not be available for construction of the combustion or recovery equipment which may be required to meet the NSPS.

RESPONSE: Before any modifications are begun, the owner or operator should plan for the possibility of complying with these standards and he should consider such things as space limitations when planning construction of new facilities or the modification or reconstruction of existing facilities. The EPA believes these requirements are reasonable because it is possible that the owner or operator of an affected facility can comply with the standards by showing a cost of VOC control to be above the established cutoff.

2.8.4 COMMENT: One commenter (D-12) indicated that Chapter 5 of the BID does not address the subject of modification and reconstruction with specific reference to distillation facilities.

The same commenter requested an explanation of what would constitute a modification or reconstruction for an existing distillation facility and how the affected facility would be expected to initiate its compliance obligations. The commenter also requested that EPA distinguish between the General Provisions of the proposed standards that apply to new facilities and those that apply to modified or reconstructed facilities.

RESPONSE: The EPA acknowledges that Chapter 5 of the BID does not address the subject of modification and reconstruction with specific reference to distillation facilities. An errata sheet has been prepared and sent to all individuals who received the incorrect copy of Chapter 5 of the BID.

As stated in the preamble, the proposed standards would apply to all affected facilities which commenced construction, reconstruction, or modification after the date of proposal of the NSPS. According to the definition of modification given in 40 CFR 60.14, a modified distillation facility would occur when any physical change in, or change in the method of operation of, an existing distillation facility increases the amount of VOC emitted into the atmosphere by that facility, or results in the emission of VOC not previously emitted. Some examples of a potential modification include: (a) replacement of column internals (e.g., trays, packing); (b) replacement of column accessories (e.g., reboiler, condenser, vacuum systems); (c) feedstock or catalyst changes; and (d) equipment changes for the purpose of energy conservation. Exceptions to the definition of modification are presented in paragraph (e) of Section 60.14. A reconstructed distillation facility, based on the definition of reconstruction in 40 CFR 60.15, occurs when components of an existing distillation facility are replaced to such an extent that: (1) the fixed capital cost of the new components exceeds 50 percent of the fixed capital cost that would be required to construct a comparable entirely new facility, and (2) it is technologically and economically feasible to meet the applicable standards. Any of the previous examples of a potential modification could also represent a potential reconstruction if these two criteria are met.

An existing distillation facility that undergoes a modification or reconstruction would be expected to initiate its compliance obligations by notifying the Administrator as required by 40 CFR 60.7 and by completing a performance test as required by 40 CFR 60.8.

2.8.5 COMMENT: One commenter (D-33) requested that the replacement of trays and packing in distillation columns not be considered a reconstruction when the cost of replacement exceeds 50 percent of the facility replacement cost and no increase in emissions results. The commenter indicated that custom fabricated trays and packing are subject to wear, corrosion, fouling, and damage and can be very expensive to replace.

RESPONSE: The EPA states in the BID for the proposed standards that the replacement of internals (trays and packing) for the most part involves a low percentage capital cost relative to a new facility. Generally, individual trays and packing are replaced one at a time in response to maintenance needs (e.g., cracked tray). Since replacement costs considered for reconstruction are only accumulated over a 2-year period, these types of replacements would not likely result in a facility being considered as reconstructed. It is possible that the internals replacement cost could approach the 50 percent criteria for large capacity columns with a large number of trays if the trays and all the packing were all replaced at the same time. However, replacements of this extent would not be regarded as a routine maintenance or repair activity. Rather, total replacement of internals would be done as a result of a process change either to increase efficiency or to make a new product.

2.9 MONITORING AND MEASUREMENT METHODS

2.9.1 COMMENT: Two commenters (D-8 and D-15) stated that the monitoring requirements will be costly and cumbersome for both the industry and EPA. The industry will be burdened by the constant vigilance and upkeep required to maintain the recording and sensing devices. One commenter (D-15) stated that the monitoring requirements would make it difficult for the Agency to properly evaluate the measurement data provided by the affected facilities because of the large amount of information involved. The other commenter (D-8) urged EPA to reduce the monitoring requirements to a more reasonable level.

RESPONSE: In establishing the monitoring requirements for this NSPS, EPA had to reconcile the need to ensure the effective operation of control and product recovery devices with the degree of complexity and economic burden of the monitoring systems on the industry. The Agency believes that it has chosen the most reliable and fair methods of monitoring. Considering the complexity of the processes involved and the burden on both EPA and industry, the monitoring and reporting methods specified are believed to be the least burdensome way of providing EPA with reliable information about changes in combustion device operation that could lead to increased VOC emissions and to ensure the proper operation and maintenance of product recovery devices.

Two monitoring methods were considered for this NSPS. One was to require the continuous monitoring of selected parameters at the final product recovery or control device. Selected parameters for an incinerator, for example, would be the inlet and outlet organics concentrations monitored continuously. This procedure would provide a continuous direct indication of actual emissions and control device efficiency. However, two monitors would be required in order to determine the incoming and outgoing organic concentrations. Therefore, it was decided that this type of system would be too complex, labor intensive and relatively expensive even if only one monitor were required on the outlet.

The other monitoring method considered was to rely on more easily measured process operating parameters that could be related to control device efficiency. These monitored values could then be compared to the values obtained during the most recent performance test to ensure the required VOC removal was still being achieved. For example, the owner or operator of an affected facility using an incinerator to comply with the standards could monitor the temperature of the firebox because it has been shown to have a profound effect on the efficiency of VOC reduction. Changes in temperature from the original test could indicate that 98 percent VOC reduction efficiency is not being achieved.

The same approach was investigated and found to be feasible for all recovery devices and combustion devices that may be used to comply with these standards. This method has the advantages of a lower cost while still having a reasonable reliability compared to the continuous monitoring of organics concentrations. Furthermore, EPA believes the cost of the monitoring requirements to be reasonable and necessary to ensure the proper operation and maintenance of control or recovery systems used to comply with the standards. Thus, the monitoring method relying on easily measured parameters was selected for this NSPS. Also, EPA has decided to allow for the use of computerized data control systems to monitor product recovery and combustion control equipment at a frequency of at least 1 percent of the compliance period (see comment 2.9.12).

2.9.2 COMMENT: Two commenters (D-11 and D-13) stated that monitoring requirements should not apply to startups, shutdowns and malfunctions. Because the standards do not exempt affected distillation facilities from monitoring requirements during irregular operations, the commenters requested this exemption be included in the monitoring section of the regulation. Also, three commenters (D-5, D-12, and D-13) stated that reporting and recordkeeping requirements are not appropriate for this NSPS for periods when there is no vent stream flow rate such as during shutdowns and malfunctions. One of the commenters (D-12) indicated that periods of no flow rate into combustion devices will occur often during shutdowns. He believes that the semiannual reporting required under Section 60.665(k) should not include these shutdowns. Another commenter (D-5) stated that the reporting requirements would apply to distillation facilities that normally have no vent stream flow rate because of the use of pressure relief valves on the accumulator or reflux drums. There would be a flow rate of the vent stream only when the pressure at the relief valve were great enough to cause a release of the gas.

One of the commenters (D-13) requested clarification on the requirement that smokeless flares not have visible emissions (except for periods of no more than 5 minutes in 2 consecutive hours). It is the commenter's impression that startups, shutdowns, and malfunctions are not covered under these standards and monitoring should not be required.

A request was made by one commenter (D-9) for an allowance of increased emissions during periods when boilers and process heaters are shutdown. Such devices are generally shutdown for periods from 5 to 10 days per year to conduct safety and operational inspections, and perform preventative maintenance work.

RESPONSE: The General Provisions (40 FR 60.8(c)), do specify that emissions in excess of the level of the applicable emission limit during periods of startup, shutdown, and malfunction are not considered a violation of the applicable emission limit. This means that emission levels during these periods are not counted as violations if they exceed the levels specified in the standards.

However, monitoring is still necessary during these periods. The General Provisions require under Section 60.11(d) that at all times, including periods of startup, shutdown, and malfunctions, owners and operators shall to the extent practicable, maintain and operate any affected facility including associated air pollution control equipment in a manner consistent with good air pollution control practice for minimizing emissions. Determination of whether acceptable operating and maintenance procedures are being used will be based on information available to the Administrator which may include, but is not limited to, monitoring results, opacity observations, review of operating and maintenance procedures, and inspection of the source.

According to the definitions given in the General Provisions, "startups" and "shutdowns" refer only to the affected facility and not to control devices. However, "malfunctions" are any sudden and unavoidable failure of the affected facility or control devices to operate in a normal manner or usual manner. Therefore, emissions beyond the limit due to scheduled maintenance work on boilers or process heaters are not allowed by EPA.

2.9.3 COMMENT: One commenter (D-27) considered it unnecessary to monitor the inlet of each incinerator within an affected facility by using a flow meter and continuous recorder according to Section 60.663(a)(2). The commenter further stated that EPA indicated in the air oxidation NSPS preamble (48 FR 48945) that a flow meter and continuous recorder are not needed because there is no meaningful relationship between flow rate and VOC reduction efficiency.

Two commenters (D-27 and D-33) stated that flow indicators are not necessary for flares, boilers and process heaters, as required under paragraphs (b)(2) and (c)(1) of Section 60.663. They indicated that although the requirement is intended to ensure vent streams are being routed for destruction, the chance of a vent stream flowing anywhere unintended is unlikely. In the case of flares, one of the commenters (D-33) felt that the only way to ensure flow to the flare is to hard pipe the flow to the flare and only the flare. The other commenter (D-27) indicated that vent streams must be actively directed for safety reasons. To avoid explosion hazards, the commenter explained, pipes and headers will have to be operated at least a little above atmospheric pressure to prevent air from leaking in. Vents from these pipes and headers will have to be pressurized and purged with either nitrogen or natural gas to remove oxygen from the vents. An oxygen monitor will also be required. Because the system is under pressure, it is unlikely that leaks of VOC to the atmosphere will occur.

One commenter also requested that reporting and recordkeeping requirements for vent stream flow rates into combustion devices be deleted from the standards according to the same reasoning provided about monitoring requirements. He added that flow rate monitoring is not required for the same equipment in the SOCMI equipment leaks NSPS and the air oxidation NSPS.

One commenter (D-33) requested that there be no requirement to monitor flow of individual vent streams at points before the streams are combined for routing to the flare. He saw no need to use monitors on individual vent stream flow which, at his proposed plant, could result in costs of up to $115,000. The commenter stated that if flow had to be monitored, EPA should require monitoring of the combined flare from all sources and not individual vents from all pipes fed to the flare.

RESPONSE: The EPA has amended the regulation (Section 60.663(a)(2)) to require flow indicators instead of flow meters for monitoring a distillation vent stream flowing into an incinerator. The Agency has determined that flow indicators are sufficient for ensuring the vent stream is being routed for destruction and that firebox temperature alone provides an adequate indication of incinerator performance.

As stated above, flow indicators and recordkeeping and reporting, are required for incinerators, as well as boilers, process heaters and flares in order that EPA can be assured vent stream emissions are routed to an appropriate control device. The EPA found that the cost associated with these requirements is reasonable. Even though vent streams may be directed to a control device for safety reasons, the Agency requires a demonstration that each vent stream is directed to a properly functioning control device. In the event flow to the combustion device is interrupted, such as emergency venting due to over pressure in the lines or a combustion device shutdown, the Agency must have a means of identifying when this occurs and how often. A discussion of the cost resulting from monitoring requirements is presented in the response to comment 2.9.1.

One commenter requested that vent stream flow indicators be required for flares at a point after all streams have been combined. The EPA will continue to require flow indicators in the vent stream from each distillation unit within an affected facility before each stream is combined with any other vent stream being routed to a combustion device. The Agency has determined the cost of this monitoring requirement to be reasonable. If indicators were not placed in each affected vent stream before it were combined, then it would not be possible for the Agency to be certain that each vent stream is routed to the combustion device. Furthermore, if nondistillation vent streams were combined with distillation vent streams before combustion and a flow indicator were placed in the combined stream, then the monitoring requirements would be applied to process streams that were not intended to be covered by the standards.

2.9.4 COMMENT: One commenter (D-13) suggested that only periodic thermocouple monitoring plus recordkeeping should be required to determine whether a boiler is in service or not in service. Section 60.663(c)(2) requires the use of a temperature measurement device equipped with a continuous recorder for boilers or process heaters of less than 44 MW (150 million Btu/hr) heat input design capacity. It was indicated that thermocouples are routinely placed in process heaters where temperatures run about 1,600 - 1,700°F. However, boilers do not usually have firebox thermocouples because the firebox temperature runs between 2,000 - 2,700°F. The commenter concluded that continuous temperature monitoring would be difficult because of high temperatures in boilers and the related problems with thermocouple maintenance. A decreased exposure time of the thermocouple to the firebox, as with periodic sampling, would decrease the heat stress upon the thermocouple and thus prolong its reliability.

RESPONSE: The EPA believes that continuous temperature monitoring of a boiler firebox with a design heat input capacity of less than 44 MW can be accomplished at a reasonable cost. In order to protect the thermocouple from heat stress, a relatively inexpensive ceramic insulator can be used (see Docket Item No. IV-J-16). The thermocouple and ceramic insulator can be purchased for less than $400 and can be permanently installed to the boiler. Thus, the continuous temperature monitoring of boilers as required under Section 60.663(c)(2) has not been changed. The EPA has changed the definition of "continuous" to mean a time interval of at least every 15 minutes. This change will allow for the use of computer-assisted systems for monitoring requirements (see comment 2.9.12).

2.9.5 COMMENT: One commenter (D-28) agreed with EPA and stated that it is appropriate to waive performance tests and monitoring requirements for sources combusting process vent streams in steam generating devices that have heat input capacities of 44 MW or greater. The commenter suggested that performance testing and monitoring requirements be waived under the following conditions: (a) boilers with heat input capacities of 44 MW or greater; (b) all combustion devices maintaining a combustion temperature of 1,100°C and 1 second residence time; or (c) incinerators maintaining a temperature of $870^{\circ}F$ and 0.75 second residence time if no halogenated organic compounds are in the vent stream.

RESPONSE: The EPA believes that condition (a) mentioned by the commenter is sufficient for exemption from performance tests. The Agency believes that boilers and process heaters with a design heat input capacity of 44 MW or greater would achieve a reduction efficiency of 98 percent or a reduction to 20 ppmv, so long as the distillation vent stream is introduced into the flame zone. These boilers and process heaters are typically operated at temperatures and residence times greater than $1,100^{\circ}C$ and 1 second, respectively. A firebox temperature of $1,100^{\circ}C$ and 1 second residence time represent the conditions that might in the worst case be necessary to achieve 98 percent reduction, even if the organics were chlorinated. Furthermore, it is to the economic advantage of the owners of facilities using boilers or process heaters to design and operate them with adequate mixing of gases to maximize the extent of combustion, thereby maximizing the steam or heat generation rate.

However, conditions (b) and (c) mentioned by the commenter are not sufficient. Even though an incineration device may be operated at temperatures greater than $1,100^{\circ}C$ and 1 second residence time ($870^{\circ}C$ and 0.75 second residence time for nonhalogenated streams) the distillation column offgas, combustion gases, and supplemental air must be well mixed in order to achieve complete combustion. The EPA has determined that proper mixing is, in fact, as important as temperature and residence time in determining incinerator efficiency. This concept is explained in an EPA memorandum (Docket Item No. II-B-3). Improperly mixed gases may actually offset the increases in efficiency generated by raising the combustion temperature. This is due to the fact that increases in temperature only increase the destruction efficiency for VOC within the well-mixed portion of the waste gas. In an improperly mixed stream the increase in temperature does not greatly affect combustion efficiency. Temperature would be a poor indicator of system efficiency in such a case.

Unfortunately, mixing is a variable which cannot be measured. Proper mixing is generally achieved through a trial-and-error process of adjusting the incinerator after startup. There is no practical method of ensuring that proper mixing occurs except by conducting a performance test and making the necessary adjustments. For this reason, incinerators operating at the temperatures and residence times expressed by the commenter in conditions (b) and (c) are not exempt from the performance test requirements.

2.9.6 COMMENT: One commenter (D-12) stated that the definition of "distillation unit" in Section 60.661 should include a vacuum pump or steam jet, if present, as part of the distillation unit. The commenter noted that it is impractical to sample upstream of these pumps or jets in vacuum distillation systems and wants to be sure that EPA would not require sampling at this location.

RESPONSE: Vacuum pumps and steam jets attached to a distillation column are necessary components for the distillation operation to occur and are considered to be examples of the accessories referred to in the definition of "distillation unit" in Section 60.661. In order to clarify that sampling downstream of a vacuum pump or jet is considered to be appropriate by EPA, the definition of "distillation unit" has been amended to specifically include these accessories.

2.9.7 COMMENT: One commenter (D-15) requested that a method for locating sampling sites for vents less than 4 inches in diameter be provided in Section 60.664(c)(1). Methods 1 or 1A are those specified for selecting a sample site. Method 1 is applicable to vents greater than 12 inches in diameter. Method 1A applies to vents from 4 to 12 inches in diameter. However, no method is given for locating sampling sites on vents less than 4 inches in diameter.

RESPONSE: Method 2D - Measurement of Gas Volume Flow rates in Small Pipes and Ducts (48 FR 48957) can be used to sample vents less than 4 inches in diameter. The method is listed in Section 60.664 as a suitable method for this NSPS.

Because a pitot tube and sampling probe, as used in larger diameter vents, would be disruptive to the flow rate of a small diameter vent, Method 2D requires that the entire vent stream be directed through a measurement device such as a rotameter. Therefore, a specific site location is not required. Section 60.664(c)(1) has been amended to clarify that no site selection method for the vent cross section is needed for vents smaller than 4 inches. Method 2D is appropriate in this case.

2.9.8 COMMENT: One commenter (D-27) requested the addition of Reference Method 2D to Section 60.664(f). This section indicates that only Methods 2A and 2C are appropriate to determine vent stream volumetric flow rates.

RESPONSE: Section 60.664(f) has been amended so that Reference Methods 2 and 2D will be allowed in order to be consistent with Section 60.664(a)(2).

2.9.9 COMMENT: One commenter (D-14) stated that the measurement of vent stream velocities according to the proposed standards may present a safety hazard. He indicated that when an orifice is placed in a vent in order to measure stream velocity, a constriction is made in the piping. This constriction would hamper the ability of the piping to handle high vent stream loads in upset conditions, possibly leading to unsafe pressure buildup in upstream equipment. Therefore, the commenter suggested deleting this requirement.

RESPONSE: If the owner or operator feels the use of an orifice meter is an unsafe procedure, there are several ways to ensure the safety of the procedure. For example, a T-joint with a rupture disc can be placed in the vent upstream of the orifice meter so that the disc is parallel to the direction of flow. The rupture disc would provide for emergency venting due to any potential pressure buildup. Because these and other safety procedures can be implemented at a relatively low cost and because methods other than orifice meters are available, EPA has not deleted the requirement to use a pipe constriction as one of several alternatives to measure the flow rate in small vents.

2.9.10 COMMENT: One commenter (D-13) suggested that rather than requiring flow monitors to be installed on all small vent streams affected by the standards, the option of tank car seals should be allowed in the regulation. It was pointed out that these seals can be used to assure that all connections on a vent line, other than to a combustion or recovery device, are closed. The commenter recommended that quarterly monitoring of the tank car seals could be used to ensure seal closure. The commenter stated that the use of these seals on vent streams fed to boilers or process heaters would allow for regulatory flexibility.

RESPONSE: As discussed in the response to comment 2.9.3, EPA has changed the monitoring requirement (Section 60.663 (a)(2)) for a vent stream combusted by an incinerator from the use of flow meters to flow indicators. Flow indicators are required to ensure that the vent stream is directed to the combustion device used to control VOC emissions. These indicators provide a record and can be quickly and regularly checked to determine if the vent stream is reaching the combustion device. The EPA decided to require the use of flow indicators because of this reliability and their low cost.

As listed in the General Provisions (Section 60.13(i)), EPA allows the owner or operator of an affected facility to apply to the Administrator to use alternatives to any monitoring procedures or requirements listed in the distillation regulation. The owner or operator can pursue this avenue for alternative methods, including tank car seals.

2.9.11 COMMENT: One commenter (D-19) expressed uncertainty about the basis for the specified accuracy of temperature recorders and flow rate recorders. The commenter stated that it is unreasonable to attain an accuracy of 1 percent or ±2.5°C at firebox temperatures of 1,100°C. The commenter also questioned the need for an accuracy of 1 percent or ±2.5°C for temperature readings on scrubbing liquids, condenser coolants, and carbon beds (Section 60.663(d)(1), (2) and (3)). The commenter indicated that this is too restrictive in light of the accuracy of current technology.

The commenter stated that for continuous flow rate recorders the accuracy of 5 percent at flow rates of 100 to 500 scfm (Section 60.663(a)(2)) seems restrictive. He feels that current recorders are not capable of providing this level of accuracy.

RESPONSE: The EPA has acquired a great deal of experience in the capabilities and limitations of various test methods and monitoring/measurement equipment. Based on this experience, the Agency has reevaluated the temperature monitor accuracy requirement and has determined that the accuracy should be 1 percent or ±0.5°C, whichever is greater. Therefore, the final regulation will require this accuracy instead of the ±2.5°C in the proposed regulation. For an incinerator operating at 870°C an accuracy of ±8.7°C would be required. These accuracies can be achieved at a reasonable cost through the use of readily available equipment. Flow meters are no longer required for the measurement of vent stream flow rate into an incinerator, instead, flow indicators are now required. Flow indicators have no accuracy requirements because their function is only to indicate the presence or absence of flow to the incinerator.

2.9.12 COMMENT: Two commenters (D-15 and D-27) requested the standards allow the use of computer-assisted systems to monitor product recovery and combustion control equipment. One commenter (D-15) stated that only intermittent recording at 6 to 10 minute intervals (not a totally continuous recording) is possible with certain computer control/recording systems. The other commenter (D-27) noted the maintenance, storage of spare parts and understanding of an analog system with a strictly continuous recording system would present many problems since they are rarely used in the industry anymore. The commenter recommended that "continuous" be defined in the regulation such that data should be collected at a frequency not less than

1 percent of the compliance period. For example, if the compliance period were 180 minutes, then the frequency of sampling would be at least every 1.8 minutes. The commenter believes that this definition of "continuous" would serve the EPA purposes equally well while still allowing industry to use a monitoring/recording system compatible with current computer control systems. The other commenter (D-15) recommended that continuous monitoring be defined as systems capable of continuously recording parameters in increments of 10 minutes or less.

RESPONSE: The EPA has agreed to add a definition of "continuous" to Section 60.661 as follows: "Continuous recorder" means a data recording device capable of recording data at time intervals of at least every 15 minutes. This will enable industry to use existing computerized data control systems attached to a measurement device. Furthermore, this time interval has been found to be an adequate time period for providing EPA with sufficient data to ensure proper operation and maintenance of VOC control equipment. The measurement device will actually be sensing on a constant basis, but the data will only be sampled at certain intervals.

2.9.13 COMMENT: One commenter (D-12) wanted to be certain that the standards provide for continuous monitoring. Therefore, he suggested a wording change for Section 60.665. Where the phrase "every-15-minutes" is used, a wording change should be made so the phrase reads "at least every 15 minutes." The same commenter requested that EPA discuss the potential difficulties in making continuously recorded measurements. He also wanted to know if reliable devices are readily available.

RESPONSE: In Section 60.665 of the proposed regulation, the phrase "every 15 minutes" refers to the measurement of parameters during performance testing to establish parameter boundaries for use during monitoring procedures to ensure that the required VOC emission reductions occur. However, based on a review of performance test requirements and monitoring requirements the regulation has been amended to require measurement and monitoring be done on a consistent basis. The measurements of temperature, specific gravity and steam mass flow rate made during performance tests are to be made at least every 15 minutes. This interval is the same as the monitoring interval discussed in the response to comment 2.9.12.

A discussion of the practicality of making continuously recorded measurements was given in the preamble to the proposed standards (48 FR 57550). Two of the criteria used by EPA to establish the monitoring requirements are reliability and accessibility. For example, continuous monitors to measure TOC were not required because they are expensive and require much maintenance. Instead, EPA chose to require monitoring of temperature and flow rate as a more reliable and less cumbersome measure that would involve readily available equipment.

2.9.14 COMMENT: One commenter (D-28) stated that Method 18 (a gas chromatography procedure for measuring organic compounds) is not always the best method to measure specific organic compound concentrations. According to the commenter, gas chromatography is not sensitive enough to detect concentrations of certain compounds in the range of 20 ppmv. It was suggested that the standards contain a discussion of alternate test procedures, such as wet chemical methods, that have greater sensitivity than gas chromatography.

RESPONSE: The EPA has judged this method to be accurate within 10 percent, and to have a lower limit of detectability to about 1 ppmv. Although Method 18 cannot be used in a limited number of situations such as in measuring compounds that can polymerize before analysis, the vast majority of organics emitted from industrial sources can be analyzed using this method. Therefore, Method 18 has been judged to be an applicable and dependable method for measuring emissions from distillation facilities. However, under Section 60.13(i), the General Provisions allow an owner or operator to apply to the Administrator for the approval of alternatives to any of the measurement requirements or procedures listed in the distillation regulation.

2.9.15 COMMENT: One commenter (D-10) stated that the actual measurement of VOC emissions from incinerators would provide a more accurate assessment of performance than what is currently required in the proposed regulation. He stated that in addition to internal operating temperature, residence time and turbulence are also important indicators of thermal incineration performance. He indicated that many incinerators have heat exchangers to preheat the incoming vent stream by using incinerator exhaust. Because of the very high operating temperatures of the incinerator, leaks may develop within the heat exchanger. According to the commenter, these leaks can permit uncombusted VOC in the incoming vent stream to migrate into the incinerator exhaust. He further pointed out that this decrease in the amount of VOC that is combusted would not be detected by monitoring internal temperature alone. The commenter stated that measurement of VOC emissions would enable the SOCMI and EPA to judge the relative merits of various control equipment designs on a consistent basis.

RESPONSE: The Agency analyzed the combustion device operating parameters that affect incinerator performance. Included in these variables are temperature, mixing, type of compound combusted, residence time, inlet concentration, and flow regime. The last two variables were judged to have only a small impact on incinerator performance. Residence time is essentially set after incinerator construction unless vent stream flow rate is changed. Compound type has little effect on combustion efficiency at temperatures above 760°C. Mixing (turbulence) was judged to be as important as temperature and residence time in determining incinerator efficiency (see Docket Item No. II-B-3). Unfortunately, mixing is a variable that cannot be measured. Given the large effect of temperature on efficiency and the low cost of temperature monitors, this variable is clearly an effective parameter to monitor.

The EPA recognizes that monitoring temperature alone is not a sufficient means of determining incinerator performance. It is for this reason that temperature and vent stream flow rate are measured during the performance test and then monitored to determine if their values deviate from the values measured during the performance test. This is true for both catalytic and thermal incinerators. Considering the complexity of the processes involved and the burden on both EPA and industry, the monitoring methods specified are believed to be the least burdensome way of ensuring that the control equipment is properly operated and maintained.

Development of leaks in the heat exchanger is an example of deterioration problems that can occur in all control equipment over a period of time. The General Provisions (Section 60.11(d) require owners and operators to maintain and operate control equipment in a manner consistent with good air pollution control practices for minimizing emissions. General enforcement inspections may be made to check for any deterioration in control equipment and to determine the need for performance tests.

2.9.16 COMMENT: Two commenters (D-11 and D-13) requested that the proposed standards include the option to monitor flare performance visually or by ultra-violet beam sensor instead of using a thermocouple heat sensor on the pilot flame of the flare. One of the commenters (D-11) stated that when a temperature device is used for flare monitoring, increased emissions may result due to shutdowns for monitoring instrument repair. Therefore, the commenter requested devices such as an ultra-violet beam sensor be allowed by these standards. The other commenter (D-13) noted that normal flare design assures a flame presence at all times because the pilot flame is supplied with gas by an independent and reliable source. It was pointed out that experience shows thermocouples to present a major and unnecessary maintenance problem. This commenter recommended flame and smoke detection to be done by a remote video camera.

RESPONSE: The EPA has decided that use of a ultra-violet beam sensor is suitable to indicate the presence of a flame. Therefore, the regulation will be amended to allow for ultra-violet beam sensors or thermocouples to be used as a heat sensing device at the pilot light to indicate the continuous presence of a flame.

The detection of flame presence by visual means or by remote video camera is not a suitable method. If a flare is operating smokelessly it can be difficult to determine if a flame is present.

2.9.17 COMMENT: One commenter (D-28) suggested that EPA provide for alternative methods of demonstrating compliance when distillation process emissions are combined with other emission sources within the plant. For example, vent streams from distillation processes may be combusted in wood-fired boilers. Since wood-fired boilers inherently generate VOC emissions, demonstration of compliance with the proposed standards may be difficult.

RESPONSE: The General Provisions (40 CFR 60.8) state that the Administrator may approve the use of "an alternative method (of demonstrating compliance), the results of which he has determined to be adequate for indicating whether a specific source is in compliance" with a standard. This is applicable to all NSPS and need not be specified in the regulation.

When distillation vent streams are combined with nondistillation offgas streams within the plant, compliance of the combined stream may be demonstrated using Reference Method 18, using an alternative method approved for the particular facility by the Administrator or waived because the owner or operator has demonstrated by other means to the Administrator's satisfaction that the affected facility is in compliance with the standards. For example, the offgas stream from a reactor may be routed through the product recovery device or directly to the control device of a distillation affected facility. The EPA has determined that if compliance is demonstrated with the combined stream, compliance would also be achieved when routing the distillation vent stream alone.

In the commenter's example wherein a wood-fired boiler is used to combust distillation vent gases, VOC will be generated by the combustion device itself. In this case, the total VOC reduction would still have to be 98 percent. If the VOC generated by the wood-fired boiler prevents this, it will not be considered in compliance with the standards.

2.9.18 COMMENT: One commenter (D-11) requested the option to use other methods to monitor condenser performance in lieu of the current requirement to monitor the exit (product side) temperature of the offgas. The commenter recommended methods such as the cooling water differential temperature or the on-line analysis of the exit VOC concentration of the condenser on the product side. Correlations developed during a performance test were also recommended as an indicator of compliance during routine operation.

RESPONSE: The EPA has determined that the monitoring of the exit (product side) temperature provides the Agency with sufficient information and is a relatively inexpensive indicator of condenser performance. Although measuring the cooling water differential temperature may also provide sufficient information, EPA does not require this measurement because it would call for the use of two temperature monitors instead of one monitor. This differential measurement would be more costly and would provide little additional information than the exiting product side temperature alone. However, as indicated in the General Provisions under Section 60.13(i) and in the distillation regulation under Section 60.663(d), the owner or operator may apply to the Administrator to use alternative monitoring methods, such as cooling water differential temperature.

A continuous monitor to measure the TOC (minus methane and ethane) exiting the condenser would be much more expensive and complex than the current monitoring requirements. Furthermore, the reliability and accuracy of these devices may be poor in some situations. Therefore, EPA has decided that, generally, the exiting product side temperature is the least burdensome way for an owner or operator to effectively monitor condenser performance. However, as indicated above, an application to the Administrator may be made to use this device in lieu of the current requirements.

2.9.19 COMMENT: One commenter (D-12) requested clarification on temperature monitoring during catalytic incineration. The commenter stated that the temperature of the incinerator after the catalyst bed is critical for compliance, not before the bed as stated in Section 60.665(c)(2).

RESPONSE: According to Section 60.665(c)(2), temperature measurement is required immediately after the catalyst bed as well as before the bed. The inlet and outlet temperatures must be monitored because a temperature differential that is within 80 percent of the differential measured during the most recent performance test indicates that catalyst performance and subsequent destruction efficiency is similar to those during performance test conditions. When only the outlet temperature is monitored, a preheated vent stream could be sent through an inactive catalyst bed at a desired temperature so it would appear as if the catalyst were functioning properly. However, monitoring a temperature rise from the inlet to outlet of the catalyst bed would indicate that the temperature increase was due to emissions destruction. Therefore, no changes will be made to the regulation concerning the monitoring requirements for catalytic incinerators.

2.9.20 COMMENT: One commenter (D-20) expressed confusion over what constitutes "recovery" with regard to the use of the TRE index. The commenter stated that the term "recovery system" is defined in Section 60.661 as an individual unit or series of material recovery units used for the purpose of recovering TOC from a vent stream. The commenter pointed out that the BID (pp. 4-8, 4-10) indicates "recovered" VOC may be disposed. The commenter prefers the definition of "recovery" to allow for the disposal of collected VOC. Therefore, he requested the definition of recovery system be revised to allow for the disposal of VOC.

The commenter stated that if recovery means reclaimed for beneficial reuse only, then the point in the recovery system where the distillation vent stream is selected for a TRE index calculation is inappropriate. If any of the organics collected from recovery equipment are reclaimed for beneficial reuse, then the TRE value is calculated for the vent stream after the recovery equipment. But, if organics exiting the same recovery equipment were disposed of, then the TRE value for the vent stream would be calculated before that equipment. The commenter noted that the same emissions would result in either case.

RESPONSE: According to Section 60.661 of the regulation, in order for the TRE to be determined after a recovery device, the VOC exiting that device must be either used, reused (e.g., recycled), or sold. The Agency maintains that disposal of VOC collected by a device does not constitute recovery of that VOC. Therefore, it is not appropriate to designate that as a recovery device for the purposes of these standards. The wording in the BID indicated by the commenter does not convey the proper intent of the standards. The outflows from the recovery devices diagrammed on pp. 4-8 and 4-10 should not have been designated as routed for disposal. Instead, the label should have indicated "for use, reuse, or sale."

In order for a control device which disposes of collected VOC to be used in complying with these standards, a 98 weight-percent VOC reduction or 20 ppmv emission limit must be maintained. However, the owner/operator of an affected facility using such a device must satisfy existing regulations concerning the disposal of the collected VOC. When using such a device to comply with the 98 weight-percent or 20 ppmv emission limit, compliance must be demonstrated as described in Section 60.664(b)(4). Furthermore, as described in Section 60.663(e), the owner/operator must provide to the Administrator information describing the operation of the control device and the process parameter(s) which would indicate proper operation and maintenance of the device.

2.9.21 COMMENT: One commenter (D-30) requested a change in the monitoring requirements for the case when two or more distillation streams containing dimethyldichlorosilone, a chemical listed Section 60.667, share a common recovery device [Section 60.664(c)(ii)]. The commenter requested an allowance for these distillation streams to be monitored after the outlet of the last methylchlorosilone hydrolysis control device. It was pointed out that in the production of dimethyldichlorosilone, as much as 50 percent of the TOC's emitted from distillation columns are methylchlorosilones. The commenter stated that these chemicals readily hydrolyze upon contact with water to form nonvolatile polysiloxane gels, water soluble silanols, and hydrogen chloride gas. The commenter indicated EPA does not recognize that VOC is removed and converted to nonvolatile forms through the hydrolysis control of methylchlorosilones. The commenter believes that a properly designed water scrubbing device provides a VOC emission control that meets the EPA standards for the production of dimethyldichlorosilone. The commenter proposed that the method for locating sites to sample flow rate and molar composition as listed under Section 60.664(c)(1)(ii) be changed to include "the outlet of the last methylchlorosilone hydrolysis control device."

The same commenter stated that Section 60.664(c)(1)(iii) does not contain sufficient information to allow evaluation of the sampling method requirements when an affected distillation column shares a common recovery device with one or more existing distillation columns. The commenter requested that EPA reword the paragraph.

RESPONSE: According to the definition of recovery system in Section 60.661 the methylchlorosilone hydrolysis control device would be a product recovery device if it were used to recover VOC exiting the device for beneficial reuse. The term, beneficial reuse, refers to the fate of VOC after it exits the recovery device. If the VOC is either sold, recycled within the process unit or used in another process unit, but not disposed of, then the VOC is beneficially reused. Therefore, the TRE determination and monitoring would be associated with the last such recovery device. If the VOC were not beneficially reused and thus disposed of, then the vent stream characteristics must be measured before that device for the TRE calculation. As discussed in the response to comment 2.9.20, the only way a device which disposes VOC can be used to comply with these standards is if a 98 weight-percent VOC reduction or 20 ppmv outlet concentration is maintained.

The commenter also requested more information on the sampling requirements when an affected distillation column shares a recovery device with one or more existing distillation columns. The EPA has decided to change the designation of affected facility such that all of the columns sharing a common recovery device would constitute a single affected facility (see comment 2.2.1). Therefore, there will be no need to apportion the vent stream between affected and nonaffected distillation columns in this case since all columns would constitute one affected facility.

2.9.22 COMMENT: Commenter D-37 stated that the TRE index should be calculated including all equipment up to the point at which the process stream vents to the atmosphere to ensure that the TRE equation can be used with respect to some developing technologies. In addition, the commenter said that the TRE equation should be modified to allow use of the characteristics of the vent stream emitted to the atmosphere. The owner/operator should then be required to demonstrate that no negative environmental impact will result from disposal of liquids or solids from the control device. The commenter stated that the proposed method for determining TRE could prevent the cost-effective use of some control devices without any commensurate benefit to environmental quality. The commenter further stated that without the modifications suggested, some control devices would be able to show compliance under the "98 percent reduction" alternative standard but not show compliance using the TRE index.

RESPONSE: As stated in the preamble to the proposed standards, a distillation column generally does not release emissions directly to the atmosphere since all offgas from it is vented to recovery devices. In developing the final standards, EPA designated the recovery system and its associated distillation columns as the affected facility because it led to greater emission reductions than alternative designations (see Comment 2.2.1). Because recovery systems are part of the process and also very effective in reducing VOC emissions, it was decided that all decisions on the need for additional VOC control should be based on the stream characteristics of the vent stream exiting the recovery system. The impacts associated with requiring additional VOC control after product recovery were then estimated and evaluated. The Administrator determined that when the cost of control of the recovery system's vent stream was greater than $1,900/Mg of VOC removed, BDT is no additional control. It was also determined that when the cost was less than $1,900/Mg of VOC removed, BDT is the reduction of VOC emissions by 98 weight-percent or to 20 ppmv. Recovery equipment normally is operated at the most economically efficient level which may not correspond to maximum reduction of VOC emissions. However, the Administrator determined that where the cost of control is less than $1,900/Mg of VOC removed, requiring an additional 98 weight-percent reduction is reasonable. The change the commenter suggested would allow the use of control devices that are not as effective as BDT. Because the impacts associated with requiring BDT are reasonable, no change has been made to the final standards.

2.10 REPORTING AND RECORDKEEPING

2.10.1 COMMENT: Three commenters (D-5, D-12, and D-13) stated that annual reporting of changes in normal operations would be sufficient instead of the semiannual reports currently required under Section 60.665(k). One commenter (D-24) agreed with the waiving of the semiannual reporting requirements for affected facilities in States where EPA, in the course of delegating the enforcement programs, approves alternative reporting requirements or means of source surveillance.

RESPONSE: Semiannual reporting is only required for the following circumstances: (a) when the monitored parameters of combustion and recovery devices exceed the latest performance tests; (b) when a vent stream is diverted from a control device or does not have a flow rate; (c) for periods when a boiler or process heater is not operating; (d) when the pilot flame of a flare is absent; (e) for any changes in a process operation that cause an increase in the maximum design vent stream flow rate for affected facilities with a flow rate less than 0.008 m^3/min; (f) for any changes in a process operation that increases the design production capacity of the process unit for affected facilities with a design production capacity less than 1 Gg/yr; and (g) for any recalculation of the TRE index value. Reporting of these occurrences are required on a semiannual, instead of annual, basis because any situation which has the potential to result in an increase in pollution should not go unreported for as long as a full year. In addition, because changes to the process can affect which control requirements the affected facility must comply with, it is important that these changes be reported at least semiannually.

The Agency also agrees that semiannual reporting should be waived when the enforcement program has been delegated to the States and alternative requirements have been approved. The Administrator has determined semiannual reporting of the above occurrences not to be overly burdensome to the industry to ensure compliance of each affected facility with the appropriate section of the standards.

2.10.2 COMMENT: One commenter (D-19) stated that the recordkeeping requirements are excessively burdensome for distillation facilities having a design capacity of less than 1 Gg/year or a designed maximum flow rate of 0.008 m^3/min. The commenter suggested that those facilities meeting the design capacity or vent stream flow rate exemption should only be required to notify EPA of its exemption status and when the status changes. The commenter requested that EPA specify under Section 60.665 what these reports should contain.

RESPONSE: The EPA has decided to exempt from coverage by the standards distillation facilities that operate with a vent stream flow rate less than 0.008 m^3/min, even if the facility is designed for a vent stream flow rate above that level. However, Section 60.665(i) has been amended to require the owner or operator of exempted facilities to record any changes in process operation that may cause the vent stream flow rate to exceed the 0.008 m^3/min level and to measure and record the flow rate after the change has been made. The EPA requires semiannual reporting of process changes and the new vent stream flow rate measurement only when changes have been made that cause the vent stream flow rate to exceed the exemption value. Examples of changes in process operation are given in comment 2.1.5.

The Agency also requires the recordkeeping and semiannual reporting of changes in process operation that increase the design production capacity of facilities with design production capacities below 1 Gg/yr. If a change in process operation does not increase the total design capacity then no recordkeeping or reporting are necessary. The EPA does not feel that semiannual reporting is excessive.

2.10.3 COMMENT: One commenter (D-5) requested clarification on the length of time that records must be maintained by the owner or operator. The commenter suggested that only the most recent performance test data be kept. It was also suggested that the continuous records of the equipment operating parameters as well as the type of information mentioned in comment 2.10.1 be kept during the interval between reporting periods.

RESPONSE: The preamble to the proposed standards states that "all records would be required to be kept up to date and in readily accessible files for 2 years." Two types of records are required to be kept for this period. One type is the operations parameters that are monitored during the operation of control devices or product recovery devices (Section 60.663, Section 60.7(d) of the General Provisions). The other type is the tabulation of periods when the measurements of the control device or product recovery device operating parameters significantly deviate from measurements of the same parameters during the most recent performance test [Section 60.665(c) through (g)].

2.10.4 COMMENT: One commenter (D-5) requested clarification on whether Section 60.665(g)(5)(i) requires recordkeeping for any affected distillation facility that changes its production rate or for only those facilities where the design capacity is exceeded.

RESPONSE: The EPA requires under Section 60.665(g)(5)(i) recordkeeping of any changes in production rate. The Agency may need this information to be certain that an affected facility demonstrating compliance with a TRE index value greater than 1.0 is still in compliance after a change in production rate has been made.

2.10.5 COMMENT: One commenter (D-12) stated that practical "parameter boundaries" are needed for the total mass steam flow during carbon bed regeneration cycles [Section 60.665(g)(3)(i)]. A parameter boundary is a limit set during the most recent performance test. Any future measurements that fall below or exceed (depending on the parameter) this limit must be recorded as specified under Section 60.665(g). Another commenter (D-11) requested that the same section allow for the exclusion of insignificant steam flow rate changes that are within the variability of the steam meter. The commenter recommended that Section 60.665(g)(3)(i) be modified by adding the following wording: "within the accuracy of the steam meter."

RESPONSE: It is inappropriate for an accuracy limit to be used as a parameter boundary because it allows for no minor deviation from the parameter value measured during the last performance test. Therefore, the regulation has been amended so that reporting is now required under Section 60.665(g) (3)(i) when the mass steam flow is more than 10 percent below the total mass flow during the most recent performance test. When the amount of steam used to regenerate a carbon bed has decreased beyond the parameter boundary, the carbon adsorber may not adequately be serving as a product recovery device and thus the TRE value may be less than 1.0.

2.10.6 COMMENT: One commenter (D-15) requested an allowance in the reporting requirements for condensers [Section 60.665(g)(2)] to account for increased water temperature during summer conditions. If the performance test is done in winter when a cooling tower or once-through river water is used for cooling, the incoming water temperature will increase by greater than 10°C in the summer. This temperature change will cause the summer operating temperature of the condenser to continuously exceed the previous winter operating temperature only because of the summer conditions.

RESPONSE: When the cooling water entering a condenser increases in temperature, the effectiveness of the condenser as a product recovery device is likely to decrease. The requirement to record and report exceedances of the operating parameters is needed for the owner or operator and the enforcement agency to know when the condenser may no longer be operating properly, even if the exceedance is due to seasonal temperature changes.

Therefore, in this case, the owner or operator should either cool the water to a temperature below the exceedance level or demonstrate to EPA that the TRE value is still above 1.0.

2.11 GENERAL

2.11.1 COMMENT: One commenter (D-21) requested better documentation of contacts between EPA and the Office of Management and Budget (OMB), especially in regard to the cost-effectiveness cutoff used in the proposed standards. To substantiate this request, the commenter cited Sierra Club v. Costle, 657 F.2d 298 (D.C. Cir. 1981), in which the court accepted the practice of reducing oral communications to memoranda and inserting them in the docket. This commenter also cited the CAA Section 307(d)(4)(B)(ii), which requires written communications to be placed in the public docket.

RESPONSE: All correspondence between EPA and OMB directly related to the proposed NSPS for SOCMI distillation operations are contained in Docket No. A-80-25, which is available for public inspection. The correspondence can be found under Docket Item Numbers II-F-1 and II-F-2. The policy of how any communication between EPA and any other Federal agency is treated by EPA has been clearly described in a letter from a previous Administrator to the commenter's organization. (Docket No. IV-C-6).

2.11.2 COMMENT: One commenter (D-15) stated that ducting the vent streams from several distillation units into a common recovery device is potentially dangerous. It was further pointed out that using a manifold to join several vent streams results in a system that is difficult to control and does not meet the safety requirements of insurance underwriters.

RESPONSE: The Agency does not require ducting vent streams into common recovery devices. However, some distillation facilities operate by using common ducting. The EPA realizes that caution must be taken when vent streams from several distillation units are ducted into a common recovery device. It is the responsibility of facility owners or operators to meet the safety requirements established by the company or its underwriters.

2.11.3 COMMENT: One commenter (D-12) stated that chemical names, mixtures, and generic terms are intermingled for the chemicals listed in Section 60.667. Also, he indicated that no Chemical Abstracts Registry (CAS) numbers were supplied. The commenter requested that the chemicals in Section 60.667 be listed according to the format used for the standards of performance for equipment leaks of VOC in SOCMI (48 FR 48342 to 48344).

RESPONSE: In order to facilitate the identification of chemicals affected by the distillation NSPS, the Agency has included the appropriate CAS numbers in Section 60.667 in the final rule. The chemicals are now listed according to the format used for the VOC equipment leaks standard.

2.11.4 COMMENT: One commenter (D-12) stated that the discussion of condensation in the BID should contain a treatment of surface condensers that do not require dehumidification equipment. It was pointed out that EPA should not assume water will be present in all distillation vent streams. The commenter indicated that presence of water vapor requires the use of dehumidification equipment. According to the commenter, this equipment would not be suitable for the production of some organics such as benzene that freeze at the temperature needed for proper water vapor control.

RESPONSE: The discussion in the BID on surface condensers is intended to provide general description of the product recovery techniques that can be used to reduce and recover VOC emissions from distillation facilities. Dehumidification equipment is included in the description of surface condensers because water must be removed from many product streams from distillation operations. However, EPA recognizes that some vent streams contain no water vapor and this is reflected in the data used to analyze the standards. Furthermore, neglecting to indicate that some surface condensers do not use dehumidification equipment does not affect the applicability of the proposed standards to the production of the listed chemicals. Therefore, no further discussion of surface condensers is planned for the BID.

2.11.5 COMMENT: One commenter (D-12) stated that the potentially detrimental impacts from energy demand as a result of the standards may offset the benefit to air quality noted in Table 1-1 of the BID. The numerical values given in Table 1-1 indicate that energy demand is expected to have minimal impacts. However, the discussion of this table in the text indicates that energy impacts could be significantly detrimental. The commenter suggested that because the BID text discusses possible negative energy impacts, Table 1-1 should quantify an energy impact that could be significantly detrimental.

RESPONSE: The numerical values given in Table 1-1 do not contradict the discussion of the table given in the text. The text does not indicate that the energy impacts are very detrimental. It indicates that the impacts are reasonable even under a worst-case scenario where in the fifth year 1.2 billion MJ/yr (190 thousand barrels of oil equivalent) would be used for a flare preference on vent streams with no halogenated compounds. Furthermore, EPA believes that the energy impacts will be substantially less than the worst-case scenario. The impacts from this worst-case scenario would be lessened because of heat recovery with combusting vent streams in boilers and process heaters, and the upgrading of product recovery equipment to raise the TRE value above the cutoff.

2.11.6 COMMENT: Two commenters (D-9 and D-14) stated that the conversion constant "K" in Section 60.664(c)(4) should be 1.740×10^{-7} instead of 1.740×10^{7} as it is presently written.

RESPONSE: Section 60.664(c)(4) will be amended to read "K = constant, 1.740×10^{-7} ..." instead of 1.740×10^{7}. A typographical error had been made.

2.11.7 COMMENT: Seven commenters (D-8, D-9, D-11, D-14, D-22, D-27, and D-33) indicated that there is an error in the first column of Table 1 in Section 60.664(c)(6). Four of the commenters (D-9, D-11, D-22, and D-27) recommended that the second line of Table 1 contain a "greater than" symbol.

2.11.8 COMMENT: One commenter (D-9) recommended that the coefficient on the second line under heading "f" of Table 1 [Section 60.664(c)(6)] should be -0.0036. The coefficient is now given as 0.0036.

RESPONSE: The commenters in 2.11.7 and 2.11.8 correctly identified errors in Table 1 of Section 60.664 in the proposed regulation. Because the coefficients and tables have been completely revised, the specifics of the comments are no longer relevant. However, the errors cited have been corrected and the corrections are incorporated into the final regulation.

2.11.9 COMMENT: Two commenters (D-11 and D-12) suggested that the word "steam" in Section 60.665(k)(2) should be changed to "stream."

RESPONSE: Section 60.665(k)(2) will be amended such that the word "steam" will be replaced by "stream."

2.11.10 COMMENT: One commenter (D-27) indicated that Section 60.663 (c)(3) should be moved to Section 60.665.

RESPONSE: Section 60.663(c)(3) is needed in order to indicate that no monitoring is required for a boiler or process heater when the design heat input is 44 MW (150 million Btu/hr) or greater. Records indicating periods of operation are required in lieu of monitoring. The same requirement is also given under Section 60.665(e).

2.11.11 COMMENT: One commenter (D-9) suggested that the "note" at the end of Section 60.660 should be placed at the end of Section 60.662.

RESPONSE: The "note" at the end of Section 60.660 is in an appropriate position because it indicates that numerical emission limits are expressed in terms of TOC's, less methane and ethane. This information is useful when reading the definitions in the next section. Three of the 13 definitions refer to TOC's.

APPENDIX A: FEDERAL REGISTER NOTICES OF ORGANIC COMPOUNDS DETERMINED TO HAVE NEGLIGIBLE PHOTOCHEMICAL REACTIVITY

INTRODUCTION

As indicated by the Federal Register notices included in this appendix, the following chemicals have been determined to be negligibly photochemically reactive compounds: methane; ethane; 1,1,1-trichloroethane; methylene chloride, trichlorofluoromethane; dichlorodifluoromethane; chlorodifluoromethane; trifluoromethane; trichlorotrifluoroethane; dichlorotetrafluoroethane; and chloropentafluoroethane.

ENVIRONMENTAL PROTECTION AGENCY

[FRL 728-6]

AIR QUALITY

Recommended Policy on Control of Volatile Organic Compounds

PURPOSE

The purpose of this notice is to recommend a policy for States to follow on the control of volatile organic compounds (VOC), which are a constituent in the formation of photochemical oxidants (smog). This notice does not place any requirements on States; State Implementation Plan (SIP) provisions which offer reasonable alternatives to this policy will be approvable. However, this policy will be followed by EPA whenever it is required to draft State Implementation Plans for the control of photochemical oxidants.

BACKGROUND

Photochemical oxidants result from sunlight acting on volatile organic compounds (VOC) and oxides of nitrogen. Some VOC, by their nature, start to form oxidant after only a short period of irradiation in the atmosphere. Other VOC may undergo irradiation for a longer period before they yield measurable oxidant.

In its guidance to States for the preparation, adoption, and submittal of State Implementation Plans published in 1971, the Environmental Protection Agency emphasized reduction of total organic compound emissions, rather than substitution. (See 40 CFR Part 51, Appendix B.) However, in Appendix B, EPA stated that substitution of one compound for another might be useful where it would result in a clearly evident decrease in reactivity and thus tend to reduce photochemical oxidant formation. Subsequently, many State Implementation Plans were promulgated with solvent substitution provisions similar to Rule 66 of the Los Angeles County Air Pollution Control District. These regulations allowed exemptions for many organic solvents which have now been shown to generate significant photochemical oxidant.

On January 29, 1976, EPA published its "Policy Statement on Use of the Concept of Photochemical Reactivity of Organic Compounds in State Implementation Plans for Oxidant Control." The notice of availability of this document appeared in the FEDERAL REGISTER on February 5, 1976 (41 FR 5350).

The 1976 policy statement emphasized that the reactivity concept was useful as an interim measure only, and would not be considered a reduction in organic emissions for purposes of estimating attainment of the ambient air quality standard for oxidants. The document also included the following statement:

> Although the substitution portions of Rule 66 and similar rules represent a workable and acceptable program at the present time, better substitution regulations can be developed, based on current knowledge of reactivity and industrial capability. EPA in collaboration with State and industry representatives will formulate in 1976 an improved rule for national use.

SUMMARY

Analysis of available data and information show that very few volatile organic compounds are of such low photochemical reactivity that they can be ignored in oxidant control programs. For this reason, EPA's recommended policy reiterates the need for positive reduction techniques (such as the reduction of volatile organic compounds in surface coatings, process changes, and the use of control equipment) rather than the substitution of compounds of low (slow) reactivity in the place of more highly (fast) reactive compounds. There are three reasons for this. First, many of the VOC that previously have been designated as having low reactivity are now known to be moderately or highly reactive in urban atmospheres. Second, even compounds that are presently known to have low reactivity can form appreciable amounts of oxidant under multiday stagnation conditions such as occur during summer in many areas. Third, some compounds of low or negligible reactivity may have other deleterious effects.

Of the small number of VOC which have only negligible photochemical reactivity, several (benzene, acetonitrile, chloroform, carbon tetrachloride, ethylene dichloride, ethylene dibromide, and methylene chloride) have been identified or implicated as being carcinogenic, mutagenic, or teratogenic. An additional compound, benzaldehyde, while producing no appreciable ozone, nevertheless, forms a strong eye irritant under irradiation. In view of these circumstances, it would be inappropriate for EPA to encourage or support increased utilization of these compounds. Therefore, they are not recommended for exclusion from control. Only the four compounds listed in Table 1 are recommended for exclusion from SIP regulations and, therefore, it is not necessary that they be inventoried or controlled. In determining reductions required to meet oxidant NAAQS, these VOC should not be included in the base line nor should reductions in their emission be credited toward achievement of the NAAQS.

It is recognized that the two halogenated compounds listed in Table 1 (methyl chloroform and Freon 113) may cause deterioration of the earth's ultraviolet radiation shield since they are nearly unreactive in the lower atmosphere and all contain appreciable fractions of chlorine. The Agency has reached conclusions on the effects of only the fully halogenated chlorofluoroalkanes. The Agency on May 13, 1977 (42 FR 24542), proposed rules under the Toxic Substances Control Act (TSCA) to prohibit the nonessential use of fully halogenated chlorofluoroalkanes as aerosol propellants. The restrictions were applied to all members of this class, including Freon 113, since they are potential substitutes for Freon 11, Freon 12, Freon 114, and Freon 115, which are currently used as aerosol propellants. The Agency is planning to investigate control systems and substitutes for nonpropellant uses under TSCA, as announced on May 13. Methyl chloroform is not a fully halogenated chlorofluoroalkane. Rather, it is among the chlorine-containing compounds for which the Agency has not completed its analysis; EPA has not yet concluded whether it is or is not a threat to the stratospheric ozone. Therefore, it has been placed on this list as an acceptable exempt compound. As new information becomes available on these compounds, EPA will reconsider the recommendation.

The volatile organic compounds listed in Table 2, while more photochemically reactive than those in Table 1, nevertheless do not contribute large quantities of oxidant under many atmospheric conditions.

TABLE 1.—*Volatile Organic Compounds of Negligible Photochemical Reactivity That Should Be Exempt From Regulation Under State Implementation Plans*

Methane
Ethane
1,1,1-Trichloroethane (Methyl Chloroform)[1]
Trichlorotrifluoroethane (Freon 113)[1]

[1] These compounds have been implicated as having deleterious effects on stratospheric ozone and, therefore, may be subject to future controls.

TABLE 2.—*Volatile Organic Compounds of Low Photochemical Reactivity*

Propane
Acetone
Methyl Ethyl Ketone
Methanol
Isopropanol
Methyl Benzoate
Tertiary Alkyl Alcohols
Methyl Acetate
Phenyl Acetate
Ethyl Amines
Acetylene
N, N-dimethyl formamide

Only during multiday stagnations do Table 2 VOC yield significant oxidant. Therefore, if resources are limited or if the sources are located in areas where prolonged atmospheric stagnations are uncommon, priority should be given to controlling more reactive VOC first and Table 2 organics later. Table 2 VOC are to be included in base line emission inventories and reductions in them will be credited toward achievement of the NAAQS. Reasonably available control technology should be applied to significant sources of Table 2 VOC where necessary to attain the NAAQS for oxidants. New sources of these compounds will also be subject to new source review requirements.

Perchloroethylene, the principal solvent employed in the dry cleaning industry, is also of low reactivity, comparable to VOC listed in Table 2. It was not included in Table 2 because of reported adverse health effects. Uses, environmental distribution, and effects of perchloroethylene currently are being studied intensively by occupational health author-ethylene currently are being studied investigations may have major impact on industrial users. In designing control regulations for perchloroethylene sources, particularly dry cleaners, consideration should be given to these findings as well as industry requirements and the cost of applying controls. Available control technology is highly cost effective for large perchloroethylene dry cleaning operations. However, for coin-operated and small dry cleaners, the same equipment would represent a heavy economic burden.

As part of its continuing program, EPA will review new information relative to the photochemical reactivity, toxicity, or effects on stratospheric ozone of volatile organic compounds. Where appropriate, additions or deletions will be made to the lists of VOC in Tabels 1 and 2.

DISCUSSION

Most air pollution control regulations applicable to stationary sources of VOC in the United States are patterned after Rule 66 of the Los Angeles County Air Pollution Control District (presently Regulation 442 of the Southern California Air Pollution Control District). Rule 66 and similar regulations incorporate two basic strategies to reduce ambient oxidant levels, *i.e.*, positive VOC reduction and selective solvent substitution based on photochemical reactivity. Positive reduction schemes such as incineration, absorption, and the use of low-solvent coatings are acknowledged means of reducing ambient oxidant levels; they should be retained in future VOC control programs. In contrast, the utility of solvent substitution strategies has been questioned as more information on photo chemical reactivity has emerged.

EPA acknowledged the shortcomings of solvent substitution based on Rule 66 reactivity criteria in a 1976 policy statement (41 FR 5350). Findings were cited which indicated that almost all VOC eventually react in the atmosphere to form some oxidant. Concurrently, EPA initiated an investigation to consider implications of revising the solvent substitution aspects of Rule 66. Three separate forms were conducted with representatives of State and local air pollution control agencies, university professors, and industrial representatives with knowledge and expertise in the fields of atmospheric chemistry and industrial solvent applications. In addition, numerous discussions were held with acknowledged experts in the field. Topics of particular concern were:

> Whether Rule 66 substitution criteria could be revised consistent with available reactivity data and yet be compatible with industrial processes and with product requirements.
>
> Whether some compounds are of sufficiently low reactivity that they are not oxidant precursors and can be exempted from control under State Implementation Plans.
>
> Whether the imposition of reactivity restrictions in addition to positive emission reductons will delay the development or implementation of promising technologies, particularly the use of water-borne and high-solids surface coatings.

Investigation showed that:

1. Solvent substitution based on Rule 66 has been directionally correct in the aggregate and probably effects some reductions in peak oxidant levels. However, because of the relatively high reactivity of most of the substituted solvents, the reduction is small compared to that which can be accomplished with positive reduction techniques. Revision of Rule 66 consistent with current knowledge of reactivity would eliminate the solvent substitution option for most sources in which substitution is new employed. Many of the organic solvents which have been categorized as having low photochemical reactivity are, in fact, moderately or highly reactive; they yield significant oxidant when subjected to irradiation in smog chambers designed to simulate the urban atmosphere.

2. A few VOC yield only negligible ozone when irradiated in smog chambers under both urban and rural conditions. Experiments conducted to date indicate that only methane and ethane, a group of halogenated paraffins, and three other organics—benzene, benzaldehyde, and acetonitrile—can be so classified. These compounds react very slowly yielding little ozone during the first few days following their release to the atmosphere. Available data suggest that none of the listed compounds contribute significant oxidant even during extended irradiation under multiday stagnation conditions.

The broad group "halogenated paraffins" includes important industrial solvents, most of which are chlorinated methanes and ethanes and chlorofluoroethanes. They find use as metal cleaning and dry cleaning solvents and as paint removers. Halogenated paraffins also serve as building blocks in the manufacture of other halogenated organics; these processes do not necessarily release significant VOC to the atmosphere.

3. Besides focusing on VOC of negligible reactivity, smog chamber studies show that a few additional VOC generate oxidant at a relatively slow rate. Under favorable atmospheric conditions, these VOC releases may not form oxidant until they have been transported substantial distances and become greatly diluted. However, under multiday stagnation conditions such as occur during summer in many areas of the middle and eastern United States, there is the potential for these organics to undergo appreciable conversion to oxidant. The more important VOC in this category are acetone, methyl ethyl ketone, perchloroethylene, methanol, isopropanol, and propane. All except propane are industrial solvents. The latter, a gas under normal conditions, is associated principally with crude oil and liquefied petroleum gas operations.

4. The vast number of volatile organic compounds—particularly nonhalogenated VOC—yield appreciable ozone when irradiated in the presence of oxides of nitrogen. While there are measurable variations in their rates of ozone formation, all are significantly more reactive than VOC listed in Table 2. Quickly reactive VOC include almost all aliphatic and aromatic solvents, alcohols, ketones, glycols, and ethers.

5. Low photochemical reactivity is not synonymous with low biological activity. Some of the negligible or slowly reactive compounds have adverse effects on human health. Benzene, acetonitrile, carbon tetrachloride, chloroform, perchloroethylene, ethylene dichloride, ethylene dibromide, and methylene chloride have been implicated as being carcinogens, teratogens, or mutagens. In addition, benzaldehyde, which produces no appreciable ozone, nevertheless forms a strong eye irritant under irradiation. While their use might reduce ambient oxidant levels, it would be unwise to encourage their uncontrolled release. Additional halogenated organics are being investigated for possible toxicity.

Most of the related health information available at this time concerns acute toxicity. Threshold limit values (TLV's) have been developed for many VOC. They are appropriate for the healthy, adult work force exposed eight hours a day, five days a week. Experts suggest that more stringent levels should be established for the general population. Hazards represented by chronic and subchronic exposure are much more difficult to quantify than acute toxicity. Adverse health effects of the VOC cited above are generally recognized although not completely quantified. Chlorinated solvents currently are under intensive study.

6. Some VOC are of such low photochemical reactivity that they persist in the atmosphere for several years, eventually migrating to the stratosphere where they are suspected of reacting and destroying ozone. Since stratospheric ozone is the principal absorber of ultraviolet (UV) light, the depletion could lead to an increase in UV penetration with a resultant worldwide increase in skin cancer. The only in-depth analysis of this potential problem has focused on the chlorofluoromethanes (CFM), Freon 11 and Freon 12, because of their known stability and widespread use in aerosol containers. A report of the National Academy of Sciences concerning environmental effects of CFM's concluded that:

> * * * selective regulation of CFM uses and releases is almost certain to be necessary at some time and to some extent of completeness.

In response to the report of the National Academy of Sciences and other studies, EPA on May 13, 1977 (42 FR 24542), proposed rules to prohibit nonessential usage of fully halogenated chlorofluoroalkanes as aerosol propellants. The restrictions were applied to all members of this class including Freon 113 since they are potential substitutes for Freon 11, Freon 12, Freon 114, and Freon 115 which are currently used as aerosol propellants.

Other stable halogenated solvents which are released in volumes comparable to the chlorofluoroalkanes also are suspected of depleting the earth's UV shield. Of major concern is the widespread substitution of methyl chloroform (1,1,1 trichloroethane) for the photochemically reactive degreasing solvent trichloroethylene. Such substitution under Rule 66 generation regulations has already influenced industrial degreasing operations to the extent that methyl chloroform production has surpassed that of trichloroethylene in the United States. Any regulation in the area will have a marked effect on the production and atmospheric emissions of both solvents. Endorsing methyl chloroform substitution would increase emissions, particularly in industrial States that have not, heretofore, implemented Rule 66. On the other hand, disallowing methyl chloroform as a substitute or banning it altogether would significantly increase emissions of trichloroethylene even if degreasers were controlled to the limits of available technology. Presently, technology is only able to reduce emissions by approximately 50 percent. In metropolitan areas which have already implemented Rule 66, a return to trichloroethylene would have an adverse effect on ambient oxidant levels. In addition to being highly reactive, trichloroethylene has been implicated as a carcinogen.

Alternatives to the above-cited choices would be (1) development and application of highly efficient degreaser control systems and (2) replacement with an intermediate solvent which is neither reactive nor detrimental to the upper atmosphere. Major revisions would be needed to degreaser designs to improve vapor capture above the current best level. Anticipated design changes could add materially to degreaser costs. No alternative solvent is clearly acceptable from the standpoints of photochemical oxidant and stratospheric ozone depletion. Neither methylene chloride nor trichlorotrifluoroethane are reactive, but, like methyl chloroform, are suspected of causing damage to the stratospheric ozone layer. In addition, methylene chloride is a suspect mutagen. Perchloroethylene, the principal dry cleaning solvent, does not present a hazard to the stratosphere but has been implicated as being a carcinogen and also reacts slowly in the atmosphere to form oxidant.

7. Organic solvents of low or negligible photochemical reactivity have only limited use in many industries. Most are chlorinated organics that find principal applications as cleaners for metals and fabrics. A few nonhalogenated VOC such as acetone, methyl ethyl ketone, and isopropanol are of low reactivity but these can't possibly satisfy all the myriad needs of the paint, plastics, pharmaceutical, or many other industries. While users of reactive VOC usually can employ effective control equipment to recover or destroy VOC emissions, they seldom have the option of applying reactivity considerations in choosing solvents. Applying reactivity restrictions to the surface coating industry would be especially disadvantageous since it would greatly inhibit the development of low-solvent coatings; essentially all of the organic solvents used to constitute high-solids coatings and water-borne coatings are, in fact, highly reactive.

8. It is recognized that smog chamber studies conducted to date are incomplete because many organic compounds have not been examined and it has been impossible to duplicate all atmospheric situations. For example, there has been only limited examination of oxidant formation under relatively high ratios of VOC to NO_x (30:1 and greater), comparable to rural conditions. Any policy on photochemical reactivity necessarily has to be open to revision as new information is developed which may show specific organic compounds to be more or less photochemically reactive than indicated by current data.

Dated: June 29, 1977.

EDWARD F. TUERK,
Acting Assistant Administrator
for Air and Waste Management.

[FR Doc.77-19686 Filed 7-7-77;8:45 am]

Review under 42 U.S.C. § 719(b) (1977 Supp.) from an order of the Secretary of Energy.

Copies of the petition for review have been served on the Secretary, Department of Energy, and all participants in prior proceedings before the Secretary.

Any person desiring to be heard with reference to such filing should on or before June 12, 1979, file a petition to intervene with the Federal Energy Regulatory Commission, 825 North Capitol Street, N.E., Washington, D.C. 20426, in accordance with the Commission's rules of practice and procedure (18 CFR 1.8). Any person wishing to become a party or to participate as a party must file a petition to intervene. Such petition must also be served on the parties of record in this proceeding and the Secretary of Energy through Gaynell C. Methvin, Deputy General Counsel for Enforcement and Litigation, Department of Energy, 12th and Pennsylvania Ave., N.W., Washington, D.C. 20461. Copies of the petition for review are on file with the Commission and are available for public inspection at Room 1000, 825 North Capitol St., N.E., Washington, D.C. 20426.

Kenneth F. Plumb,

Secretary.

[FR Doc. 79-17230 Filed 6-1-79; 8:45 am]

BILLING CODE 6450-01-M

[Docket No. RI79-36]

Triton Oil & Gas Corp.; Petition for Declaratory Order

May 29, 1979.

Take notice that on April 5, 1979, Triton Oil and Gas Corporation (Triton), One Energy Square, 4925 Greenville Avenue, Dallas, Texas 75206 filed in Docket No. RI79-36 a petition for declaratory order pursuant to Section 1.7 of the Commission's Rules of Practice and Procedure. Triton requests a determination that it has no refund obligation under Southern Louisiana Area Rate Opinion No. 598 for rates it collected for certain sales of gas. The gas is produced from four fields in the Southern Louisiana Area and sold to Tennessee Gas Pipeline Company, Texas Gas Transmission Company and Southern Natural Gas Company under Triton's Rate Schedules 1 and 5, 6, and 7 respectively.

On June 6, 1978, the Commission directed Triton, among other producers, to disburse refunds for the period from October 1968 to January 1971 pursuant to the Commission's Opinion Nos. 598 and 598–A or show cause why such refunds were not due. Triton's position is that because sales under these rate schedules were authorized by permanent certificates of public convenience and necessity which contained no refund conditions, there is no refund obligation. Triton acknowledges that the Commission may order refunds and reductions in rates after August 1, 1971—the effective date of Opinion No. 598. However, it asserts that the Commission is without authority to order such adjustments prior to the effective date where rates were not collected subject to a suspension order or under a temporary certificate.

Any person desiring to be heard or to make any protest with reference to said petition should file a petition to intervene or a protest with the Federal Energy Regulatory Commission, 825 North Capitol Street, N.E., Washington, D.C. 20426, in accordance with requirements of the Commission's rules of practice and procedure (18 C.F.R. 1.8 or 1.10). All such petitions or protests should be filed on or before June 20, 1979. All protests filed with the Commission will be considered by it in determining the appropriate action to be taken but will not serve to make the protestants parties to the proceeding. Any person wishing to become a party to a proceeding, or to participate as a party in any hearing therein, must file a petition to intervene in accordance with the Commission's rules.

Kenneth F. Plumb,

Secretary.

[FR Doc. 79-17229 Filed 6-1-79; 8:45 am]

BILLING CODE 6450-01-M

[Docket No. RP78-68]

United Gas Pipe Line Co.; Informal Settlement Conference

May 22, 1979.

Take notice that on June 7, 1979, at 1:30 p.m. an informal conference of all interested persons will be convened for the purpose of continued settlement discussions in this proceeding. The conference will be held in Room 3200 of the Federal Energy Regulatory Commission at 941 North Capitol Street, N.E., Washington, D.C. 20426.

Customers and other interested persons will be permitted to attend, but if such persons have not previously been permitted to intervene by order of the Commission, attendance will not be deemed to authorize intervention as a party in this proceeding.

All parties will be expected to come fully prepared to discuss the merits of the issues arising in this proceeding and to make commitments with respect to such issues and any offers of settlement or stipulation discussed at the conference.

Lois D. Cashell,

Acting Secretary.

[FR Doc. 79-17231 Filed 6-1-79; 8:45 am]

BILLING CODE 6450-01-M

Office of Energy Conservation and Solar Applications

Meeting Regarding Emergency Building Temperature Restrictions Program

Notice is hereby given that the Department of Energy (DOE) will hold a meeting with the National Governors' Association on Friday, June 8, 1979, at 11 a.m. in Room 285, 444 North Capitol Street, Washington, D.C.

The purpose of the meeting will be to discuss the role of the States in implementing the Emergency Building Temperature Restrictions Program. This program is authorized by the President's "Standby Conservation Plan No. 2: Emergency Building Temperature Restrictions," which recently was approved by the Congress.

Issued in Washington, D.C. on May 31, 1979.

Maxine Savitz,

Deputy Assistant Secretary, Conservation and Solar Applications.

[FR Doc. 79-17080 Filed 6-1-79; 12:05 pm]

BILLING CODE 6450-01-M

ENVIRONMENTAL PROTECTION AGENCY

[FRL 1238-6]

Air Quality; Clarification of Agency Policy Concerning Ozone SIP Revisions and Solvent Reactivities

ACTION: This notice is published under the authority of section 101(b) and section 108 of the Clean Air Act. The notice clarifies EPA's "Recommended Policy on Control of Volatile Organic Compounds," 42 FR 35314 (July 8, 1977).

STATEMENT: The July 1977 Policy Statement noted that only reactive volatile organic compounds participate in the chemical reactions that form photochemical oxidants. Currently available information suggests that negligibly photochemically reactive volatile organic compounds as defined in that Statement, including methyl chloroform and methylene chloride, do not appreciably affect ambient ozone levels. Hence, EPA will not disapprove any state implementation plan or plan revision for its failure to contain regulations restricting emissions of these compounds.

Although these substances need not be controlled under state implementation plans for the purpose of achieving ambient ozone standards, nothing in this memorandum is intended to modify past EPA expressions of concern about the uncontrolled use of methyl chloroform and methylene chloride. As noted in the above referenced policy and the clarification presented in memoranda of August 24, 1978 and March 6, 1979, there is suggestive evidence that both compounds are potentially carcinogenic and methyl chloroform is suspected of contributing to depletion of stratospheric ozone. See, for example, the following studies:

Simmon, V. F., Kauhanen, K. and Tardiff, R. G., "Mutagenic Activity of Chemicals Identified in Drinking Water" in *Progress in Genetic Toxicology*, ed. I. D. Scott, B. A. Bridges, and F. H. Sobels, at 249–258 (Elsevier, 1977);

Price, P. G., Hassett, C. M. and Mansfield, O. L. "Transforming Activities of Trichloroethylene and Proposed Industrial Alternatives" *In Vitro* 14:3, at 290–293 (1978);

Theiss, J. C., Stoner, G. D., Shimkin, M. B., *et al.*, "Test for Carcinogenicity of Organic Contaminants of United States Drinking Waters by Pulmonary Tumor Response In Strain A Mice," *Cancer Research*, 37(8 Pt. 1): 2717–20, (August 1977);

The EPA Carcinogen Assessment Group's Preliminary Risk Assessment on Methyl Chloroform, Type I—Air Program, (January 17, 1979);

The EPA Carcinogen Assessment Group's Preliminary Risk Assessment on Methylene Chloride, Type I—Air Program, (January 17, 1979);

Conference on Methyl Chloroform and other Halocarbon Pollutants, sponsored by Environmental Sciences Research Laboratory, U.S. EPA, February 27–28, 1979, Washington, D.C. (proceedings in press).

Because both methyl chloroform and methylene chloride are potentially harmful, EPA recommends that these chemicals not be substituted for other solvents in efforts to reduce ozone concentrations. EPA further recommends that the states control these compounds under the authority reserved to them in section 116 of the Clean Air Act. Moreover, there is a strong possibility for future regulation of these compounds under the Clean Air Act.

FOR FURTHER INFORMATION CONTACT: Joseph Padgett, Director, Strategies and Air Standards Division, Office of Air Quality Planning and Standards, MD-12 Research Triangle Park, North Carolina 27711 (919) 541–5204.

Dated: May 25, 1979.

David G. Hawkins,

Assistant Administrator for Air, Noise and Radiation.

[FR Doc. 79-17284 Filed 6-1-79; 8:45 am]

BILLING CODE 6560-01-M

[FRL 1239-3]

Region II; Groundwater System of the New Jersey Coastal Plains Aquifer

On March 21, 1979, a notice was published stating that a petition has been submitted by the Environmental Defense Fund, Inc. and the Sierra Club-New Jersey Chapter, pursuant to Section 1424(e) of the Safe Drinking Water Act, Pub. L. 93–523, requesting the Administrator of the Environmental Protection Agency to make a determination that the aquifer underlying the Counties of Monmouth, Burlington, Ocean, Camden, Gloucester, Atlantic, Salem, Cumberland and Cape May and portions of Mercer and Middlesex Counties, New Jersey is the sole or principal drinking water source for the coastal plain area which, if contaminated, would create a significant hazard to public health.

The notice indicated that comments, data and references in response to the petition should be submitted by May 21, 1979. Due to the complexity of issues which surround the designation of the Coastal Plain Area as a sole source aquifer, EPA was requested to extend the comment period. In order to permit sufficient time for all interested individuals to provide their input, EPA will extend the comment period on this petition request from May 21, 1979 to August 20, 1979. Comments, data and references in response to the Coastal Plain Petition should be submitted in writing to Eckardt C. Beck, Regional Administrator, Region II, Environmental Protection Agency, 26 Federal Plaza, Room 1009, New York, N.Y. 10007, Attention: Coastal Plain Aquifer. Information concerning the Coastal Plain Aquifer System will be available for inspection at the above address.

Dated: May 21, 1979.

Eckardt C. Beck,

Regional Administrator.

[FR Doc. 79-17285 Filed 6-1-79; 8:45 am]

BILLING DATE 6560-01-M

[FRL 1239-3 OPP-00093]

State-FIFRA Issues Research and Evaluation Group (SFIREG); Working Committee on Enforcement; Open Meeting

AGENCY: Environmental Protection Agency (EPA), Office of Pesticide Programs.

ACTION: Notice of Open Meeting.

SUMMARY: There will be a two-day meeting of the Working Committee on Enforcement of the State-FIFRA Issues Research and Evaluation Group (SFIREG) on Tuesday and Wednesday, June 5–6, 1979, beginning at 8:30 a.m. each day, and concluding by 12 noon on June 6th. The meeting will be held at the Atlanta Town House, 100 Tenth Street, N.W., Atlanta, Georgia, Telephone: 404/892–6800, and will be open to the public.

FOR FURTHER INFORMATION CONTACT: Mr. William Buffaloe, North Carolina Department of Agriculture, Raleigh, North Carolina, Telephone: 919/733–3556; or Mr. Anthony Dellavecchia, Pesticide and Toxic Substances Enforcement Division, EPA, 401 M Street, S.W., Washington, D.C., telephone: 202/755–0914.

SUPPLEMENTARY INFORMATION: This the second meeting of the Working Committee on Enforcement. The meeting will be concerned with the following topics:

1. Plan for future recall and suspension orders;
2. Clarification of undefined terms in Section 26 and 27 of FIFRA;
3. Status of State primacy use enforcement notice;
4. Use of recommendations of agricultural extension publications by pesticide sales representatives;
5. Discussion of definition of "non crop land;"
6. FIFRA Section 7—producers of active ingredients; and
7. Other enforcement matters which may arise.

Dated: May 25, 1979.

Edwin L. Johnson,

Deputy Assistant Administrator for Pesticide Program.

[FR Doc. 79-17286 Filed 6-1-79; 8:45 am]

BILLING CODE 6560-01-M

Included within the definition of nontarget sites are areas of permanent human habitation including permanent residences, schools, churches, and areas in which substantial commercial activities are conducted (e.g., shopping centers), domestic apiaries, and publicly-maintained roads. In addition, aquatic habitats such as critical fisheries, municipal water supply intakes and other waters (which include rivers, streams, ponds, lakes, and ephemeral streams and ponds with flowing or standing water visible from an aircraft flying at an altitude of 1,000 feet above the terrain at the time of treatment), are included within the definition of a sensitive area. The release of any pesticide spray is not permitted over a sensitive area or in the surrounding buffer zone. Buffer zones are defined as areas intended to receive only spray drift fallout from the application sites.

The Agency recognizes that some seasonal dwellings, such as hunting and fishing camps, may be located in or adjacent to the treatment area. These dwellings are not considered to be permanent residences and thus will not be buffered against direct application. However, many of these dwellings are near aquatic sites listed in Table II which will be buffered.

To minimize operational errors, overflights of the treatment area prior to the actual spray operation are encouraged. The purpose of these overflights is to locate visually all sensitive areas and buffer zones designated on the spray block maps. Particular attention should be given to identifying ephemeral streams and ponds visible from an aircraft flying at an altitude of 1,000 feet or less above the terrain at the time of treatment, which may not be designated on the spray block map due to their seasonality.

Authority

This Advisory Opinion governing the use of certain insecticides for the suppression of the spruce budworm in Maine through July, 1980, is issued pursuant to the authority granted to the Administrator by Section 2(ee) of FIFRA, 7 U.S.C. 136(ee) (Supp. 1979). Section 12(a)(2)(G) of FIFRA makes it unlawful for any person "to use any registered pesticide in a manner inconsistent with its labeling." Section 2(ee) defines this terminology as prohibiting the use of registered pesticide "in a manner not permitted by the labeling." However, section 2(ee) also provides that this prohibition does not apply with respect to "any use of a pesticide in a manner that the Administrator determines to be consistent with the purposes of this Act."

Effective Date: This Notice is effective through July 21, 1980.

Dated: May 5, 1980.

Steven D. Jellinek,

Assistant Administrator for Pesticides and Toxic Substances.

[FR Doc. 80-[illegible] Filed 5-15-80; 8:45 am]

BILLING CODE 6560-01-M

[FRL 1480-7]

Air Quality; Clarification of Agency Policy Concerning Ozone SIP Revisions and Solvent Reactivities

BACKGROUND: This notice is published under the authority of § 101(b) and § 103 of the Clean Air Act. The notice provides further clarification of a policy announced in EPA's "Recommended Policy on the Control of Volatile Organic Compounds," 42 FR 35314 (July 8, 1977) and "Clarification of Agency Policy Concerning Ozone SIP Revisions and Solvent Reactivities," 44 FR 32042 (June 4, 1979).

DISCUSSION: The previous policy statements on the control of volatile organic compounds (VOC's) noted that methyl chloroform and methylene chloride are negligibly photochemically reactive and do not appreciably contribute to the formation of ozone. Consequently, controls on emissions of these two compound would not contribute to the attainment and maintenance of the national ambient air quality standards for ozone. In the June 1979 policy statement EPA explained that it would not disapprove any state implementation plan (SIP) or plan revision for its failure to contain regulations restricting emissions of methyl chloroform and/or methylene chloride.

Today's statement clarifies EPA policy regarding state implementation plan submittals which do contain regulations restricting emissions of the two compounds. Section 110(a)(1) of the Clean Air Act limits state implementation plans to measures designed to achieve and maintain the national ambient air quality standards (NAAQS). Because current information indicates that emissions of methyl chloroform and methylene chloride do not appreciably affect ambient ozone levels, EPA cannot approve measures specifically controlling emissions of either or both compounds as part of a federally enforceable ozone SIP. EPA will take no action on any measures specifically controlling emissions of the two compounds which are submitted by the states as ozone SIP measures for EPA approval. If a state chooses to control emissions of these compounds, such measures will be considered as state regulations only and not as part of an ozone SIP. EPA will not enforce controls on emissions of either methyl chloroform or methylene chloride adopted by the state as part of an implementation plan for ozone.

States retain authority to control emissions of these compounds under the authority reserved to them under Section 116 of the Clean Air Act. For further information relevant to the exercise of this authority see the July 8, 1977 and June 4, 1979 policy statements. This policy notice should not be read as a statement of EPA's views on the desirability of controls on these substances.

Finally, EPA wishes to point out that this policy notice addresses only the Agency's lack of authority to include in federally approved SIPs controls on substances whose emissions do not contribute, either directly or indirectly, to concentrations of pollutants for which NAAQS have been established under section 109 of the Act. This policy notice does not address the question of SIP measures which control substances contributing to concentrations of pollutants for which NAAQS have been established, but which are contended to be more strict than absolutely necessary to attain and maintain the NAAQS. EPA has no authority to exclude such measures from SIPs.

FOR FURTHER INFORMATION CONTACT: G. T. Helms, Chief, Control Programs Operations Branch (MD-15), Research Triangle Park, North Carolina 27711. (919) 541-5226, FTS 629-5226.

Dated: May 9, 1980.

David G. Hawkins,

Assistant Administrator for Air, Noise and Radiation.

[FR Doc. 80-15124 Filed 5-15-80; 8:45 am]

BILLING CODE 6560-01-M

[FRL 1491-7; PP 8G1807/T239]

Extension of a Temporary Tolerance

AGENCY: Environmental Protection Agency (EPA).

ACTION: Notice.

SUMMARY: EPA has extended the temporary tolerance for residues of the herbicide thidiazuron (*N*-phenyl-N'-1,2,3-thiadiazol-5-ylurea) and its aniline-containing metabolites in or on the raw agricultural commodities cottonseed at 0.2 part per million (ppm), milk 0.05 ppm, eggs 0.1 ppm, meat fat and meat byproducts of cattle, goats, hogs, horses, poultry, and sheep at 0.2 ppm.

Dempasco Service Sta. U.S. 1 and Hwy A1A, Juno Beach, FL 33408—5–14–80
Par Mobil, 324 Par Avenue, Orlando, FL 32804—3–18–80
John Gibson, I–65 and KY 90, Cave City, KY 42127—3–18–80
Bellmeade Shell, 5315 S. Harding, Nashville, TN 37205—3–19–80
Corner Store, 1401 No. Main Street, Kissimmee, FL 32741—3–19–80
Kopper Kettle, Highway 100 & I–65, Franklin, KY 42134—4–7–80
Buechel Terrace Chevron, 4219 Bardstown Rd., Louisville, KY 40218—4–10–80
LaPorte Exxon, 1625 S. Federal Hwy, Hollywood, FL 33020—4–24–80
Risner's Chevron, 3420 Lebanon Road, Hermitage, TN 37076—5–12–80
Douglas Amoco Service, 583 Donaldson Pike, Nashville, TN 37214—5–14–80
Town & River Texaco, 1024 Cypress Lakes Rd, Ft Meyers, FL 33907—5–14–80
Trail Sunoco, 6168 So. Tamimiami, Ft Meyers, FL 33907—5–14–80
Villas Chervron, 8180 So. Tamamiami, Ft Meyers, FL 33907—5–14–80
Port Comfort, Box 105, Rt 24, Ft Meyers, FL 33908—5–15–80
Cantrell's Exxon, 1910 Dickerson Rd, Nashville, TN 37207—5–16–80
Barker Westgate Standard, 2510 Pio Nono Ave, Macon, GA 31206—5–19–80
Seminole Exxon, 1948 W. Tenn, Tallahassee, FL 32304—5–19–80
Fred Hulsey's Chevron, 5012 Romeiser Road, Macon, GA 31204—5–20–80
Winston Chevron, 825 Madison Street, Huntsville, AL 35801—5–22–80
H & A Fuel Service, P.O. Box 448, Hardeville, SC 29929—5–23–80
Chancy's Standard, P.O. Box 1708, St Simons Island, GA 31522—5–28–80
Norman's Standard, 3304 Glynn Avenue, Brunswick, GA 31520—5–28–80
Plaza Standard, 1965 Glynn Avenue, Brunswick, GA 31520—5–28–80
Coley's Exxon, Rt 1 I–85 and SC 290, Duncan, SC 29334—5–28–80
Bingham's Texaco, Rt 1 I–85 and SC 290, Duncan, SC 29334—5–28–80
White's Exxon, Hwy I–85 and SC–9, Spartanburg, SC 29303—5–28–80
Mauldin Chevron, 804 N. Main, Mauldin, SC 29662—5–29–80
Wade Hampton Mall Exxon, 1035 Wade Hampton Blvd, Greenville, SC 29609—5–29–80
Harris Standard, P.O. Box 405, Nahunta, GA 31553—5–29–80
Pittman's Standard, I–75 and Juliette Rd, Forsyth, GA 31029—5–30–80
Trout's Texaco, 106 N A 1 A Hwy, Satellite Beach, FL 32937—5–30–80
Magnolia Plantation, P.O. Drawer, Tifton, GA 31794—5–30–80
M & M 78, 1100 SR 524 Rt 1, Cocoa, FL 32922—5–30–80

Issued in Atlanta, Georgia on the 11th day of July 1980.

James C. Easterday,
District Manager.

Concurrence:

Leonard F. Bittner,
Chief Enforcement Counsel.

[FR Doc 80-[illegible] Filed 7-21-80 8:45 am]
BILLING CODE [illegible]

ENVIRONMENTAL PROTECTION AGENCY

[FRL 1546-7]

Air Quality; Clarification of Agency Policy Concerning Ozone SIP Revisions and Solvent Reactivities

AGENCY: Environmental Protection Agency (EPA).

ACTION: Notice.

BACKGROUND: This notice is published under the authority of section 101(b) and section 103 of the Clean Air Act. The notice provides further clarification of a policy announced in EPA's "Recommended Policy on the Control of Volatile Organic Compounds," 42 FR 35314 (July 8, 1977) and "Clarification of Agency Policy Concerning Ozone SIP Revisions and Solvent Reactivities," 44 FR 32042 (June 4, 1979) and 45 FR 32424 (May 16, 1980).

DISCUSSION: The previous policy statements on the control of volatile organic compounds (VOCs) noted that despite concerns about their potential toxicity 1,1,1-trichloroethane (methyl chloroform) and methylene chloride are negligibly photochemically reactive and do not appreciably contribute to the formation of ozone. Today's statement expands the list (45 FR 32424) of organic compounds (VOCs) of negligible photochemical reactivity to include the following chlorofluorocarbons (CFC) or fluorocarbons (FC):
trichlorofluoromethane (CFC–11);
dichlorodifluoromethane (CFC–12);
chlorodifluoromethane (CFC–22);
trifluoromethane (FC–23);
trichlorotrifluoroethane (CFC–113);
dichlorotetrafluoroethane (CFC–114);
and chloropentafluoroethane (CFC–115).

EPA has determined that these halogenated compounds are no more photochemically reactive than methyl chloroform and methylene chloride and do not appreciably contribute to the formation of ambient ozone. Consequently, controls on emissions of these compounds would not contribute to the attainment and maintenance of the national ambient air quality standards for ozone. EPA cannot approve or enforce controls on these compounds as part of a Federally enforceable ozone State Implementation Plan (SIP). EPA will take no action on any measures specifically controlling emissions of these compounds which are submitted by the States as ozone SIP measures for EPA approval. (See 45 FR 32424.)

However, EPA would like to reiterate its continuing concern over the possible environmental effects from emissions of these compounds. As such, EPA is not precluding the possible future regulation of these compounds.

It should be recognized that the two halogenated compounds, methyl chloroform and CFC–113, stated to be of negligible photochemical reactivity in the July 8, 1977 Federal Register, have been implicated in the depletion of the stratospheric ozone layer. This layer is a region of the upper atmosphere which shields the earth from harmful wavelengths of ultraviolet radiation that increase the risk of skin cancer in humans.

In response to this concern, the Agency promulgated on March 17, 1978 (43 FR 11318), rules under the Toxic Substances Control Act (TSCA) to prohibit the nonessential use of fully halogenated chlorofluoroalkanes as aerosol propellants. Restrictions were applied to all members of this class, including CFC–113, since they are potential substitutes for CFC–11, CFC–12, CFC–114, and CFC–115, which are currently used as aerosol propellants. The Agency is investigating control options and substitutes for nonpropellant uses.

EPA has proposed new source performance standards under Section 111 for organic solvent cleaners (45 FR 39766, June 11, 1980). These proposed standards would limit emissions of the reactive volatile organic compounds trichloroethylene and perchloroethylene as well as methyl chloroform, methylene chloride, and trichlorotrifluoroethane (CFC–113) from new, modified, or reconstructed organic solvent degreasers. If these standards are promulgated, EPA will develop a guideline document for States to use in developing regulations required under Section 111(d) for existing organic solvent cleaners that use any of the designated compounds.

Whether, and to what extent, methyl chloroform and methylene chloride are human carcinogens or have other toxic effects, and to what extent methyl chloroform, CFC–113, and other CFCs deplete the ozone layer, are issues of considerable debate. Detailed health assessments of methyl chloroform, methylene chloride, and CFC–113 are being prepared by EPA's Office of

Research and Development. These assessments will be submitted for external review, including a review by the Science Advisory Board, prior to promulgation of the regulations and the proposal of EPA guidance to States for developing existing source control measures. The extent to which the preliminary findings are affirmed by the review process may affect the final rulemaking for new as well as existing sources.

Until these issues of environmental impact are fully resolved, EPA remains concerned that if these chemicals are exempted from regulation, the substitution of exempt for nonexempt solvents could result in large increases of emissions of pollutants that may have adverse health impacts.

The emissions of CFC–22 and FC–23, also of relatively low photochemical reactivity, are of continuing concern with regard to possible environmental effects. Consequently, EPA is not precluding the possible future regulation of these compounds as well.

Finally, EPA wishes to point out that this notice addresses only the Agency's lack of authority to include in Federally approved SIPs controls on substances whose emissions do not contribute, either directly or indirectly, to concentrations of pollutants for which NAAQS have been established under Section 109 of the Act. This policy notice does not address the question of SIP measures which control substances contributing to concentrations of pollutants for which NAAQS have been established, but which are contended to be more strict than absolutely necessary to attain and maintain the NAAQS. EPA has no authority to exclude such measures from SIPs.

FOR FURTHER INFORMATION CONTACT: G. T. Helms, Chief, Control Programs Operations Branch (MD–15), Research Triangle Park, North Carolina 27711, (919) 541–5226, FTS 629–5226.

Dated: July 16, 1980.

David G. Hawkins,

Assistant Administrator for Air, Noise, and Radiation.

[FR Doc. 80-21881 Filed 7-21-80; 8:45 am]

BILLING CODE 6560-01-M

[FRL 1545–5]

California State Motor Vehicle Pollution Control Standards; Public Hearing

AGENCY: Environmental Protection Agency (EPA).

ACTION: Notice of public hearing on requests for waivers of Federal preemption.

SUMMARY: The California Air Resources Board (CARB) notified EPA of two recent amendments to California's emission standards and test procedures for motor vehicles produced by certain small-volume manufacturers, and requested a waiver of Federal preemption for each amendment. EPA will consider these waiver requests, among other issues, at a public hearing already scheduled for July 24, 1980 at EPA's San Francisco office, as announced in a Federal Register notice of July 3, 1980.

DATES: Hearing July 24, and if necessary July 25, 1980.

ADDRESSES: EPA will consider the waiver requests at a public hearing held at: U.S. Environmental Protection Agency Regional Office (Region IX), Nevada Room, Sixth Floor, 215 Fremont Street, San Francisco, California. Copies of all materials relevant to the hearing are available for public inspection during normal working hours (8:00 a.m. to 4:30 p.m.) at: U.S. Environmental Protection Agency, Public Information Reference Unit, Room 2922 (EPA Library), 401 M Street, SW., Washington, D.C. 20460.

FOR FURTHER INFORMATION CONTACT: Glenn Unterberger, Chief, Waivers Section, Manufacturers Operations Division (EN–340), U.S. Environmental Protection Agency, Washington, D.C. 20460, (202) 472–9421.

SUPPLEMENTARY INFORMATION:

I. Background and Discussion

Section 209(a) of the Clean Air Act, as amended, 42 U.S.C. 7543(a) ("Act"), provides in part: "No state or any political subdivision thereof shall adopt or attempt to enforce any standard relating to control of emissions from new motor vehicles or new motor vehicle engines subject to this part * * * [or] require certification, inspection, or any other approval relating to the control of emissions * * * as condition precedent to the initial retail sale, titling (if any), or registration of such motor vehicle, motor vehicle engine, or equipment."

Section 209(b)(1) of the Act requires the Administrator, after notice and opportunity for public hearing, to waive application of the prohibitions of section 209 to any State which had adopted standards (other than crankcase emission standards) for the control of emissions from new motor vehicles or new motor vehicle engines prior to March 30, 1966, if the State determines that the State standards will be, in the aggregate, at least as protective of public health and welfare as applicable Federal standards. The Administrator must grant a waiver unless he finds that: (1) The determination of the State is arbitrary and capricious, (2) the State does not need the State standards to meet compelling and extraordinary conditions, or (3) the State standards and accompanying enforcement procedures are inconsistent with section 202(a) of the Act.

Pursuant to these provisions, the Administrator of EPA granted California waivers of Federal preemption allowing the State to enforce its exhaust emission standards for 1979 and subsequent model year passenger cars [1] and for 1979 and subsequent model year light-duty trucks (LDTs) and medium-duty vehicles (MDVs). [2] In *American Motors Corp.* v. *Blum* [3], the D.C. Circuit held that section 202(b)(1)(B) of the Act entitled American Motors Corporation (AMC) to two additional years of lead time to meet certain California oxide of nitrogen (NO$_x$) emission standards for passenger cars.

As a result, in a Federal Register notice issued July 3, 1980, the Administrator modified his passenger car waiver decision with respect to 1980 and 1981 model year AMC passenger cars, and announced a public hearing to reconsider the earlier LDT/MDV waiver decisions in light of *AMC* v. *Blum*. The notice further provided that EPA would consider at the public hearing any new waiver requests filed by California on or before July 7, 1980 to cover amended NO$_x$ standards and enforcement procedures for 1980 and later model year passenger cars and 1981 and later year passenger cars and 1981 and later year model year LDTs and MDVs manufactured by AMC.

In a June 13, 1980 letter to the Administrator, CARB notified EPA that it had taken several actions to revise California's new motor vehicles emissions control program in response to *AMC* v. *Blum*. CARB requested a waiver of Federal preemption for the following items:

(i) Amendments to exhaust emission standards and test procedures for 1980 and later model year passenger cars, light-duty trucks and medium-duty

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[1] 43 FR 25729 (June 14, 1978).

[2] 43 FR 1829 (January 12, 1978) (for California's 1979–1982 model year LDTs and MDVs); 43 FR 15490 (April 13, 1978) (for California's 1983 and later model year LDTs and MDVs).

[3] 603 F. 2d 978 (D.C. Cir. 1979).

APPENDIX B: TRE EQUATION AND COEFFICIENT DEVELOPMENT FOR THERMAL INCINERATORS AND FLARES

B.1 INTRODUCTION

This appendix describes the development of the TRE index equations used in the standards for distillation operations. These equations can be used to directly calculate the TRE index based on the vent stream flowrate (scm/min), heating value (MJ/scm), and VOC emission rate (kg/hr).

B.2 INCINERATOR TRE INDEX EQUATION

This section presents the method used to develop the incinerator TRE index equation and an example calculation of the incinerator TRE index.

B.2.1 Incinerator TRE Index Equation Development

The incinerator TRE index equation was developed in the following manner. First, an equation for total annualized cost was determined by combining the equations for each component of the annualized costs. The equations for each annualized cost component are shown in Docket Item No. IV-B-15 and include annualized capital costs, supplemental gas costs, labor costs, electricity costs, quench water costs, scrubber water costs, neutralization costs, and heat recovery credits.

The equation for total annualized costs developed from the equations for each annualized cost component (Docket Item No. IV-B-15) was divided by the amount of VOC removed and the reference cost effectiveness of $1,900/Mg of VOC removed to generate the general TRE index equation. Collecting like terms results in an equation with the following form:

$$TRE = \frac{1}{E_{TOC}} [a + b(Q_s)^{0.88} + c(Q_s) + d(Q_s)(H_T) + e(Q_s{}^{0.88})(H_T{}^{0.88}) + f\,(Y_s)^{0.5}]$$

where for a vent stream flowrate (scm/min) at a standard temperature of 20°C is greater than or equal to 14.2 scm/min:

TRE = Total resource effectiveness index value.

Q_s = Vent stream flowrate (scm/min), at a standard temperature of 20°C.

H_T = Vent stream net heating value (MJ/scm), where the net enthalpy per mole of vent stream is based on combustion at 25°C and 760 mm Hg, but the standard temperature for determining the volume corresponding to one mole is 20°C, as in the definition of Q_s.

E_{TOC} = Hourly emissions of total organic compounds reported in kg/hr measured at full operating flowrate.

Y_s = Q_s for all vent stream categories listed in Table B-1 except for Category E vent streams where $Y_s = (Q_s)(H_T)/3.6$.

where for a vent stream flowrate (scm/min) at a standard temperature of 20°C that is less than 14.2 scm/min:

TRE = Total resource effectiveness index value.

Q_s = 14.2 scm/min

H_T = (FLOW)(HVAL)/14.2

where:

FLOW = Vent stream flowrate (scm/min), at a temperature of 20°C.

HVAL = Vent stream net heating value (MJ/scm), where the net enthalpy per mole of vent stream is based on combustion at 25°C and 760 mm Hg, but the standard temperature for determining the volume corresponding to one mole is 20°C, as in the definition of Q_s.

E_{TOC} = Hourly emissions of total organic compounds reported in Kg/hr measured at full operating flowrate.

Y_s = Q_s for all vent stream categories listed in Table B-1 except for Category E vent streams where $Y_s = (Q_s)(H_T)/3.6$.

The coefficients a through f are functions of incinerator design parameters, such as temperature, residence time, supplemental fuel requirements, etc. There are six different design categories of incinerators used

TABLE B-1. DISTILLATION NSPS TRE COEFFICIENTS FOR VENT STREAMS CONTROLLED BY AN INCINERATOR

DESIGN CATEGORY A1. FOR HALOGENATED PROCESS VENT STREAMS, IF 0 ≤ NET HEATING VALUE (MJ/scm) ≤ 3.5:

Q_s = Vent Stream Flowrate (scm/min)	a	b	c	d	e	f
$14.2 \leq Q_s \leq 18.8$	19.18370	0.27580	0.75762	-0.13064	0	0.01025
$18.8 < Q_s \leq 699$	20.00563	0.27580	0.30387	-0.13064	0	0.01025
$699 < Q_s \leq 1400$	39.87022	0.29973	0.30387	-0.13064	0	0.01449
$1400 < Q_s \leq 2100$	59.73481	0.31467	0.30387	-0.13064	0	0.01775
$2100 < Q_s \leq 2800$	79.59941	0.32572	0.30387	-0.13064	0	0.02049
$2800 < Q_s \leq 3500$	99.46400	0.33456	0.30387	-0.13064	0	0.02291

DESIGN CATEGORY A2. FOR HALOGENATED PROCESS VENT STREAMS, IF NET HEATING VALUE > 3.5 MJ/scm:

Q_s = Vent Stream Flowrate (scm/min)	a	b	c	d	e	f
$14.2 \leq Q_s \leq 18.8$	18.84466	0.26742	0.20044	0	0	0.01025
$18.8 < Q_s \leq 699$	19.66658	0.26742	-0.25332	0	0	0.01025
$699 < Q_s \leq 1400$	39.19213	0.29062	-0.25332	0	0	0.01449
$1400 < Q_s \leq 2100$	58.71768	0.30511	-0.25332	0	0	0.01775
$2100 < Q_s \leq 2800$	78.24323	0.31582	-0.25332	0	0	0.02049
$2800 < Q_s \leq 3500$	97.76879	0.32439	-0.25332	0	0	0.02291

DESIGN CATEGORY B. FOR NONHALOGENATED PROCESS VENT STREAMS, IF 0 ≤ NET HEATING VALUE (MJ/scm) ≤ 0.48:

Q_s = Vent Stream Flowrate (scm/min)	a	b	c	d	e	f
$14.2 \leq Q_s \leq 1340$	8.54245	0.10555	0.09030	-0.17109	0	0.01025
$1340 < Q_s \leq 2690$	16.94386	0.11470	0.09030	-0.17109	0	0.01449
$2690 < Q_s \leq 4040$	25.34528	0.12042	0.09030	-0.17109	0	0.01775

DESIGN CATEGORY C. FOR NONHALOGENATED PROCESS VENT STREAMS, IF 0.48 < NET HEATING VALUE (MJ/scm) ≤ 1.9:

Q_s = Vent Stream Flowrate (scm/min)	a	b	c	d	e	f
$14.2 \leq Q_s \leq 1340$	9.25233	0.06105	0.31937	-0.16181	0	0.01025
$1340 < Q_s \leq 2690$	18.36363	0.06635	0.31937	-0.16181	0	0.01449
$2690 < Q_s \leq 4040$	27.47492	0.06965	0.31937	-0.16181	0	0.01775

DESIGN CATEGORY D. FOR NONHALOGENATED PROCESS VENT STREAMS, IF 1.9 < NET HEATING VALUE (MJ/scm) ≤ 3.6:

Q_s = Vent Stream Flowrate (scm/min)	a	b	c	d	e	f
$14.2 \leq Q_s \leq 1180$	6.67868	0.06943	0.02582	0	0	0.01025
$1180 < Q_s \leq 2370$	13.21633	0.07546	0.02582	0	0	0.01449
$2370 < Q_s \leq 3550$	19.75398	0.07922	0.02582	0	0	0.01775

DESIGN CATEGORY E. FOR NONHALOGENATED PROCESS VENT STREAMS, IF NET HEATING VALUE > 3.6 MJ/scm:

Y_s = Dilution Flowrate (scm/min) = $(Q_s)(H_T)/3.6$	a	b	c	d	e	f
$14.2 \leq Y_s \leq 1180$	6.67868	0	0	0.00707	0.02220	0.01025
$1180 < Y_s \leq 2370$	13.21633	0	0	0.00707	0.02412	0.01449
$2370 < Y_s \leq 3550$	19.75398	0	0	0.00707	0.02533	0.01775

in the costing algorithm. These design categories and category parameters are discussed in Chapter 8 of the BID for the Air Oxidation Processes in SOCMI (EPA-450/3-82-001a). Table B-2 presents the updated heating values and flowrate intervals associated with each category. Substituting the design values into the general equation allows values for coefficients a through f to be derived for each design category. This derivation is included in Docket item No. IV-B-15.

The results of this deriviation are summarized in Table B-1. As shown, the coefficients are divided into six incinerator categories. Under each design category listed in Table B-1, there are several intervals of vent stream flowrate. Each flowrate interval is associated with a different set of coefficients. The first flowrate interval in each design category applies to vent streams with a flowrate corresponding to the smallest control equipment system easily available without special custom design.

The remaining flowrate intervals in each design category apply to vent streams which would be expected to use two, three, four, or five sets of control equipment, respectively. These flowrate intervals are distinguished from one another because of limits to prefabricated equipment sizes.

B.2.2 Example Calculation of an Incinerator-based TRE Index Value for a Facility

This section presents an example of use of the TRE index equation. The example distillation vent stream has the following characteristics:

1. Q_s = 284 scm/min
2. H_T = 0.37 MJ/scm
3. E_{TOC} = 76.1 kg/hr.
4. Y_s = 284 scm/min.
5. No halogenated compounds in the vent stream.

Based on the stream heating value of 0.37 MJ/scm, Category B is the applicable incinerator design category for this stream. The flowrate is 284 scm/min, and therefore the coefficients for the first flowrate interval under Category B are used. The coefficients for Category B, flow interval #1 are:

TABLE B-2. MAXIMUM VENT STREAM FLOWRATES AND NET HEATING VALUE CHARACTERISTICS FOR EACH DESIGN CATEGORY

Category	Minimum Net Heating Value (MJ/scm)*	Maximum Net Heating Value (MJ/scm)*	Maximum Process Vent Stream Flowrate at Incinerator Inlet (10^3 scm/min)
A1	0	3.5	0.70
A2	3.5	-	0.70
B	0	0.48	1.34
C	0.48	1.9	1.34
D	1.9	3.6	1.18
E	3.6	-	1.18

---

*These values are based on process vent stream conditions.

$a = 8.54$
$b = 0.106$
$c = 0.090$
$d = -0.171$
$e = 0$
$f = 0.010$

The TRE equation is:

$$TRE = \frac{1}{E_{TOC}} [a + b(Q_s)^{0.88} + c(Q_s) + d(Q_s)(H_T) + e(Q_s{}^{0.88})(H_T{}^{0.88}) + f\ (Q_s)^{0.5}]$$

$$TRE = (.013)[8.54 + 0.106\ (284)^{0.88} + (0.090)(284)(-0.171)$$
$$(284)(.37) + 0 + 0.010)(284)^{0.5}]$$

$$TRE = 0.111 + 0.199 + 0.332 - 0.236 + 0 + 0.002$$

$$TRE = 0.408$$

Since the calculated TRE index value of 0.408 is less than the cutoff value of 1.0, this facility would be required to reduce VOC emissions by 98 weight-percent or to 20 ppmv because the cost of incineration is considered to be reasonable. Because the TRE index is a ratio of two cost-effectiveness values, it is possible to calculate cost effectiveness for controlling any vent stream given its TRE index value. The TRE index value of the facility is multiplied by the reference cost effectiveness \$1,900/Mg as follows:

TRE = 0.408
Reference cost effectiveness = \$1,900/Mg
Cost effectiveness for example stream = (0.408)(1,900) = \$775/Mg of VOC removed

If the TRE index value for this example were above 1.0, the flare-based TRE equation (see Section B.3) would be used to calculate the flare-based TRE index because flares can be applied to nonhalogenated vent streams. If the flare-based TRE index were less than 1.0, this facility would have to reduce VOC emissions by 98 weight-percent or to 20 ppmv, whichever is less stringent. If the flare TRE index were also above 1.0, or if the stream contained halogenated compounds so a flare could not be used, then no further controls would be required.

B.3 FLARE SYSTEM TRE DEVELOPMENT

This section presents the development of the flare TRE index equation, verification of the equation, and an example calculation of the flare TRE index.

B.3.1 Development of the Flare TRE Index Equation

The flare TRE index equation was developed by selecting a general form for the equation which contained the stream characteristics of flowrate, heating value, and VOC emission rate as the independent variables, and the TRE index as the dependent variable, and fitting this equation to the TRE index values calculated from the annualized cost equations. The form of the TRE index equation for flaring had to be selected so that an accurate prediction of the TRE index could be obtained for a given set of vent stream characteristics. The form of the flare TRE index equation selected was the same as the form used in the proposed standards for Distillation Operations (50 FR 20446).

The general form of the equation is as follows:

$$TRE = \frac{1}{ETOC}\left[a(Q_s) + b(Q_s)^{0.8} + c(Q_s)(H_T) + d(E_{TOC}) + e\right]$$

where:

TRE = total resource effectiveness index value

Q_s = vent stream flowrate (scm/min) at a standard temperature of 20°C

H_T = vent stream net heating value (MJ/scm) where the net enthalpy per mole of vent stream is based on combustion at 25°C and 760 mm Hg, but the standard temperature for determining the volume corresponding to one mole is 20°C as in the definition of Q_s.

E_{TOC} = hourly emission rate of total organic compounds reported in kg/hr measured at full operating flowrate.

a, b, c, d, and e are coefficients.

The coefficients for the flare TRE index equation were developed with a regression analysis procedure. The regression analysis procedure used is the General Linear Model (GLM) procedure of the Statistical Analysis System Institute, Inc., Raleigh, North Carolina. The development of the coefficients involved three steps: (1) formation of an appropriate data base for the regression; (2) calculating a TRE index value for each set of vent stream characteristics in the data base with the revised flare costing procedure described in Docket Entry IV-B-8; and (3) using the GLM procedure to regress TRE index values against the vent stream characteristics.

The distillation NSPS National Emissions Profile (NEP) and the reactor processes Emissions Data Profile (EDP) were used as the data base for the regression analysis. Adding the reactor processes EDP was judged to be appropriate because of two significant similarities with the distillation NEP: (1) the vent stream characteristics represented in the two data bases are similar; and (2) identical or similar synthetic organic chemicals are produced by both reactor processes and distillation operations.

After the data base was formed, the cost of controlling VOC emissions using flares was calculated from the annualized cost equations for each facility with nonhalogenated vent streams in the NEP and EDP. These costs were divided by the amount of VOC emissions reduced by flaring (i.e., 98 weight-percent) to obtain a value for cost of control per megagram of VOC reduced. Next, these values were divided by a TRE cutoff of $1,900/Mg to obtain a TRE index value for each facility. The TRE index value and vent stream characteristics for each facility were then input to the GLM regression program.

Coefficients were developed for each term in the TRE equation using the TRE index value as the dependent variable and the vent stream characteristics as independent variables. The flare TRE coefficients are shown in Table B-3. A set of coefficients was developed for each of two cases: (1) combustion with a flare for vent streams with heating values below 11.2 MJ/scm (300 Btu/scf), and (2) combustion with a flare for vent streams with heating values at or above 11.2 MJ/scm (300 Btu/scf). The first set of coefficients include the natural gas cost incurred by facilities with vent stream heating values below 11.2 MJ/scm (300 Btu/scf). For this type of stream, enriching with natural gas to reach 11.2 MJ/scm (300 Btu/scf) is necessary to ensure a 98 weight-percent reduction efficiency of VOC. No enriching is necessary for facilities with vent stream heating values at or above 11.2 MJ/scm (300 Btu/scf). Therefore a second set of TRE coefficients was developed for streams with heating values at or above 11.2 MJ/scm.

B.3.2 Flare TRE Coefficients Verification

The flare TRE equation and coefficients were examined to ensure their capability of accurately predicting the TRE index value for a facility from the vent stream characteristics. The verification procedure for the flare TRE coefficients involved several steps: (1) calculation of a TRE index value using the newly derived TRE equation for each facility in the data base; (2) calculation of a TRE index value using the flare cost algorithm described in Docket Entry IV-B-8 for each facility in the data base; and (3) comparison of the TRE index values from (1) and (2) through the calculation of percent difference. The verification procedure focused on those cases where the TRE index value is around 1.0 because it is important to have the most accurate predictive capabilities in this critical region. The results of the verification procedure are discussed below.

For vent streams with heating values at or above 11.2 MJ/scm, the percent difference in TRE index values near the cutoff range from -0.49 to 3.39. Thus, it was concluded that the coefficients for this category of vent streams provide good agreement with the actual TRE index values. Table B-4 presents a comparison of TRE indexes near the cutoff for vent streams with heating values at or above 11.2 MJ/scm. The comparison is between TRE index

TABLE B-3. DISTILLATION OPERATIONS NSPS TRE COEFFICIENTS FOR VENT STREAMS CONTROLLED BY A FLARE

	a	b	c	d	e
Flare $H_T < 11.2$ MJ/scm	2.25	0.288	-0.193	-0.0051	2.08
Flare $H_T \geq 11.2$ MJ/scm	0.309	0.0619	-0.0043	-0.0034	2.08

TABLE B-4. TRE INDEX VALUES GENERATED USING TRE COEFFICIENTS AND THE FLARE COST ALGORITHM NET HEATING VALUE GREATER THAN OR EQUAL TO 300 Btu/scf

Flowrate (scf/min)	Heat Content (Btu/scf)	VOC (lb/hr)	TRE INDEX VALUE		Percent Difference
			Algorithm	Coefficients	
70.00	323.00	6.60	0.88	0.91	3.39
1.45	903.00	1.60	2.90	2.91	0.43
1.20	1024.00	3.81	1.22	1.22	0.03
2.04	1024.00	6.47	0.72	0.72	-.08
1.39	966.00	6.04	0.77	0.77	-.06
.20	2778.00	2.00	2.31	2.31	-.01
0.30	4978.00	4.90	0.95	0.94	-.49
6.60	1286.00	3.00	1.57	1.57	0.08

values calculated with the TRE equation and those calculated using the cost algorithm for the same facility as described above.

For vent streams with heating values below 11.2 MJ/scm there was poor agreement initially between the algorithm and TRE equation. Therefore, those data points resulting in very high TRE indexes were removed after the initial verification procedure was performed because they caused the poor agreement at TRE index values near the cutoff. After removal of those data points, the TRE coefficients for vent stream heating values less than 11.2 MJ/scm were recalculated and the verification procedure was undertaken again. The percentage difference in the recalculated TRE index values near the cutoff ranged from 2.38 to -7.39. Thus, it was concluded that the recalculated TRE coefficients for vent streams with heating values below 11.2 MJ/scm provided good agreement with the actual TRE index values. Table B-5 presents a comparison of TRE indexes near the cutoff for vent streams with heating values below 11.2 MJ/scm.

As a final verification step for vent streams with heating values below 11.2 MJ/scm, the recalculated TRE coefficients were used to determine a TRE index value for those data points which were removed after the initial verification procedure was performed. The percentage difference between the TRE index values determined using the recalculated coefficients and the TRE index values determined using the flare cost algorithm ranged from 2.29 to -6.24. Thus, it was concluded that the coefficients enable accurate estimation of even those facilities with high TRE index values. Table B-6 presents a comparison of TRE index values for those vent streams with high TRE index values.

In summary, the flare TRE equations developed for this NSPS allow for the calculation of TRE index values that are highly correlated with the TRE index values obtained from the costing algorithm. The TRE equations do not necessarily result in the best statistical fit between TRE values and vent stream characteristics. This is because the primary concern in developing the equation and coefficients is to ensure very good agreement between the TRE equation and cost algorithm for TRE's at or around the cutoff.

TABLE B-5. PERCENT DIFFERENCE BETWEEN TRE INDEX VALUES GENERATED USING TRE EQUATION AND THE FLARE COST ALGORITHM NET HEATING VALUE LESS THAN 300 Btu/scf

Flowrate (scf/min)	Heat Content (Btu/scf)	VOC (lb/hr)	TRE INDEX VALUES		Percent Differences Compared to Algorithm Coefficients Recalculated[a]
			Algorithm	Coefficients Recalculated[a]	
17.00	181.00	16.00	0.38	.37	-2.23
75.00	102.00	6.10	2.12	2.12	- .10
50.40	70.00	16.90	0.65	0.65	0.00
4.40	190.00	4.00	1.22	1.24	1.84
22.60	92.00	10.50	0.73	0.69	-5.16
11.30	168.00	5.23	1.16	1.07	-7.39
68.70	72.00	26.30	0.50	0.50	0.21
7.57	18.00	5.00	1.14	1.16	2.06
27.30	47.00	8.50	1.02	0.99	-3.63
4.20	18.00	28.50	1.04	1.06	1.29
88.00	47.00	2.50	0.57	.58	0.68
7.50	47.00	4.00	2.23	2.28	2.38
2.40	260.00	4.00	1.17	1.18	1.05
17.90	69.00	8.00	0.92	0.87	-5.71
15.00	149.00	6.60	0.96	0.91	-5.29
80.00	9.00	19.60	0.87	0.86	-1.53

[a] TRE coefficients derived from vent streams with a heating value greater than 40 Btu/scf but less than 300 Btu/scf.

TABLE B-6. PERCENT DIFFERENCES BETWEEN THE INDEX VALUES GENERATED BY THE COST ALGORITHM AND THE TRE EQUATION FOR VENT STREAMS WITH HEATING VALUES LESS THAN 40 Btu/scf

Flowrate (scf/min)	Heat Content (Btu/scf)	VOC (lb/hr)	TRE INDEX VALUE		Percent Difference
			Algorithm	Coefficients[a]	
99.00	0.00	0.10	203	202	- .91
822.00	0.00	0.10	1325	1290	-2.65
16.67	4.00	.37	21	20	-5.16
0.05	36.00	0.10	46	46	0.19
39.20	4.00	0.18	61	60	-2.28
6.60	8.00	.60	9	9	2.24
2.00	0.00	.003	1640	1658	1.14
6.25	9.00	.40	14	14	2.29
12.40	0.00	0.14	51	48	-6.24
13.53	0.00	0.03	242	228	-5.96

[a] Equation coefficients were developed after excluding vent streams with heating values less than 40 Btu/scf.

B.3.3 Example Calculation of a Flare-Based TRE Index Value for a Facility

This section presents an example calculation for the same vent stream used in Section B.2.2. The vent stream characteristics are as follows:

1. Q_s = 284 scm/min
2. H_T = 0.37 MJ/scm
3. E_{TOC} = 76.1 kg/hr
4. No halogenated compounds in vent stream.

Based on the stream heating value of 0.37 MJ/scm, the coefficients for this stream are as follows:

a = 2.25
b = 0.288
c = -0.193
d = -0.0051
e = 2.08

Substituting these values into the general TRE index equation gives the following result:

$$TRE = 0.013[2.25(284)+0.288(284)^{0.8}-0.193(284)(0.37)-0.0051(76.1)+2.08]$$

$$TRE = 8.41$$

This index is above the cutoff of 1.0. However, as previously shown in Section B.2.2, the TRE index for an incinerator applied to this stream was below 1.0. Therefore, this facility would be required to reduce VOC emissions by 98 weight-percent or below 20 ppmv.

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15. SUPPLEMENTARY NOTES This document presents the background information used by the Environmental Protection Agency in developing the final new source performance standards for emissions of volatile organic compounds from distillation unit operations in the synthetic organic chemical manufacturing industry.

16. ABSTRACT

Standards of performance for the control of volatile organic compound (VOC) emissions from distillation unit operations in the synthetic organic chemical manufacturing industry are being promulgated under Section 111 of the Clean Air Act. These standards will apply to VOC emissions from newly constructed, modified, and reconstructed distillation units. This document summarizes the responses to public comments received on the proposed standards and the basis for changes made since proposal.

17. KEY WORDS AND DOCUMENT ANALYSIS

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